PNZ carbon

RETROFIT CREDITS

HACT

Green Home Finance Accelerator Discovery Phase – Evidence Report: Retrofit Credits Securitisation

3.10.23

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Executive Summary

Introduction, aims and objectives

Homes are the single largest contributor of carbon emissions from the built environment, accounting for almost a quarter of the UK's total carbon emissions and representing the largest barrier to reaching net zero by 2050. The scale of investment needed to tackle this means that unlocking private sector investment will be critical to decarbonising the housing stock, to ensure that households aren't penalised in the transition.

Voluntary carbon markets are the best way to do this. This is a market in which businesses can buy, sell and trade carbon credits — which account for one tonne of carbon dioxide being removed, or avoided. When used effectively, high-quality carbon credits can help businesses and investors reach their net zero goals more quickly and target their capital into impactful projects that make a genuine and measurable impact. There are also significant economic opportunities, with the market for carbon credits potentially worth upward of $50bn by 2030.

PNZ Carbon (formerly Arctica Partners) and the Housing Associations' Charitable Trust (HACT) are facilitating the UK's transition to net zero, by funding the affordable retrofitting of British homes from the commercial demand for transparent, localised carbon credits. Our carbon credits (known as Retrofit Credits) can help fund domestic home retrofit without the need for further Government spending or the imposition of costs on households.

PNZ Carbon's methodology is the only one in the world for originating carbon credits for the decarbonisation of housing stock, and only the second UK project of any kind to have our credits certified by global standards organisation Verra.

In the current model, retrofit measures must be funded upfront before carbon credits can be generated and sold. Crediting is for up to 21 years, making this a long-term income stream. The party that has funded the installation will only receive the total value of the crediting income after completing the entire crediting period.

This project has investigated whether a structured financial product could be formulated that results in up to 10 years of carbon credit cash flows being securitised.

In the Discovery Phase, this project has successfully demonstrated that a green home finance product can be structured that results in up to 10 years of carbon credit cash flows being securitised and an upfront lump sum paid to the installer carrying out the work, enabling them to do the work at a subsidised rate for the homeowner.

During the discovery phase, this project had the following objectives:

- Identify a suitable structured finance product which aligns with projected carbon credit cashflows.
- Identify appropriate parties to participate in a structured product such as investment/pension funds or bond issuance.
- Investigate and identify organisations to receive upfront payment of credits, such as installers or retail banks in order that they can pass them on through discounted installation costs or favourable loan rates.
- Market testing with stakeholders to refine and finalise the product.

The original objectives have not been modified during project delivery activities.

The total project cost was £230,484.96, and the Department for Energy Security and Net Zero grant contribution was £169,210.62.

Key barriers and/or challenges

The challenges of retrofitting homes in the UK are many, and they are complex. Homes are the single largest contributor of carbon emissions from the built environment, accounting for almost a quarter of the UK's total carbon emissions, and representing the largest barrier to reaching net zero by 2050.[1]

The scale of investment needed to tackle this means that unlocking private sector investment will be critical to decarbonising the housing stock, to ensure that households aren't penalised in the transition.

Government alone cannot finance the net zero transition. As it stands, current commitments will increase emissions by 10.6% by 2030, compared to 2010 levels.[2] Concerted action is needed now to scale and finance the net zero transition. Responsibility cannot fall on governments alone — every part of society has a role to play in tackling climate change.

For this reason, high-quality carbon credits will be an essential solution in the Net Zero transition. Investment in transparent, localised carbon credits, when used in conjunction with genuine emissions reduction efforts, can help businesses and investors target their capital into impactful projects that make a genuine and measurable impact towards net zero.

PNZ Carbon and HACT help to address this, providing a route for investment in housing decarbonisation by verifying the emission reductions and social value of housing retrofit projects, and originating verified carbon credits backed by those reductions. Our work during

1 Climate Change Committee (CCC) (2023) 2023 Progress Report to Parliament. *Available online at: link*

[2] United Nations Framework Convention on Climate Change (UNFCCC) (2022) Climate Plans Remain Insufficient: More Ambitious Action Needed Now. *Available online at: link*

the GHFA Discovery Phase has demonstrated that carbon finance can play an essential role in helping to expedite the pace and scale of housing retrofit.

Key findings from research and other activities

Our research activities have involved studying how increased retrofit deployment can result in socioeconomic disparities[3] [4] and uneven or inequitable market dynamics, banking and financing patterns, and resource deployment[5] [6].

Focussing on micro-generation retrofit adoption, we have identified that this form of retrofit is almost exclusively secured by higher-income households, creating disproportionate access and exacerbating demographic inequity[7]. Most adopters are self-financed with cash. Compared to the broader population, adopters of micro-generation retrofit tend to live in higher-value homes, have higher credit scores, are more educated, are older, and have steady jobs.

There is a clear need for a solution to address this issue and allow low and medium income households to take advantage of retrofit opportunities where there is the greatest need.Our understanding of these dynamics has informed the development of our green home finance product that works by deploying the securitisation model for carbon credits that we have developed as part of the GHFA Discovery Phase to fund the installation of retrofit measures free of charge for low and moderate-income households.

Key process learnings

Our learnings from the GHFA Discovery Phase have informed the development of our green home finance product as part of the GHFA Discovery Phase. Our model involves future cash flows from the long-term sale of carbon credits (in our case for up to 21 years) being

[3] M. Lacey-Barnacle, 2020, 'Proximities of energy justice: contesting community energy and austerity in England Energy Res. Social Sci., 69 (2020), p. 101713

[4] N. Balta-Ozkan, et al., 2021, 'Energy transition at local level: analyzing the role of peer effects and socio-economic factors on UK solar photovoltaic deployment' Energy Pol., 148 (2021), p. 112004

[5] S. Knox, et al., 2021, 'The (In)justices of Smart Local Energy Systems: A Systematic Review, Integrated Framework, and Future Research Agenda', Energy Research & Social Science, vol. 83, Elsevier Ltd (2022), p. 102333, 10.1016/j.erss.2021.102333 October 2021

[6] B.Sovacool et al., 2022, 'Towards improved solar energy justice: Exploring the complex inequities of household adoption of photovoltaic panels', Energy Policy, Volume 164, May 2022, 112868

[7] S. Carley, D.M. Konisky, 2020, 'The justice and equity implications of the clean energy transition' Nat. Energy, 5 (2020), pp. 569-577, 10.1038/s41560-020-0641-6

converted into an upfront lump-sum that more closely matches the timing of the expenditure associated with the retrofit activity. This upfront payment for future generated credits is used to fund the affordable installation of retrofit activity or indeed free-of-charge installation for low and moderate-income households across the UK.

This means that funds raised from the purchase of carbon credits are channelled through our securitisation structure directly creating a closed-loop system to finance the decarbonisation of homes and supercharge the green energy transition.

Research suggests that business models which do not require capital purchases can address demographic inequities in access to retrofit activity. We feel such a system could be advanced in the UK, with an approach that creates high-quality carbon credits from retrofit projects with the overlay of a securitisation structure.

Reflections on key outcomes achieved

A key highlight of the project has been the positive receptiveness of consumers, installers, lenders, credits buyers and stakeholders to the securitisation concept, particularly around our pioneering use of carbon credit revenue to accelerate housing decarbonisation. This is particularly reflected in the interest of installers and commercial purchasers of the credits.

Carbon offsetting has often been distrusted as a tool for achieving net zero targets, despite playing a vital role in global decarbonisation efforts. This, in part, is due to the lack of clarity associated with their economic and social impact – particularly when invested in projects overseas. PNZ Carbon and HACT have pioneered a local circular economy model which helps to resolve this. We work with local buyers to fund local emissions reduction projects, which deliver benefits in their own communities. Crucially, this measurable and localised approach drives greater transparency and integrity.

During the GHFA Discovery Phase, we completed the first verification audit of our verified carbon project, which enabled us to issue the first credits at Verra Registry. Credits from our verified carbon project generated about £100,000 in revenue (for the emission reductions achieved from July to December 2022). Over the next twenty years, we forecast that the credits generated from these retrofit activities will raise over £7m that can be reinvested back into retrofit work.

Recognising the importance of retrofit on residents' lives, our project uses the UK Social Value Bank approach to measure the health and well-being impacts of housing retrofit (a process included in HM Treasury's Green Book for policy appraisal of non-market traded assets). During the discovery phase, the retrofit works completed achieved a social value equivalent to £2.9m annually, including savings to the exchequer.

Developing, testing and demonstrating the veracity of PNZ Carbon's methodology to originate credits has been a critical focus during the Discovery Phase. The successful completion of the verification audit demonstrated that our concept for creating domestic voluntary carbon credits works and has allowed us to confidently move to begin securitising carbon credits backed by UK domestic housing retrofit and clean energy measures.

During the GHFA Discovery Phase, we have enrolled installers in the service as a conduit to the owner-occupied housing sector. The service now has over 100,000 homes registered, via the enrolled installers from across the UK, including homes in rural and urban communities and from all regions and countries. Registration refers to homes that are expected to have retrofit measures installed with finance from our carbon crediting mechanism.

The other part of the discovery phase has been for us to identify buyers to purchase the credits. We are delighted that all the carbon credits generated during the discovery phase were sold during the GHFA Discovery Phase, with The Economist, Ibstock, Berkeley Group and Unity Trust Bank securing significant tranches. A range of other organisations also wanted to show their support of the service by purchasing smaller numbers, including Igloo, Hunters and Kinovo.

During the GHFA Discovery Phase, and in recognition of our work accelerating the UK's net zero journey, our project was awarded the 2023 Ashden Award for Energy Innovation. Ashden Awards highlight proven solutions to the climate crisis and energy access challenges. Ashden's mission is to accelerate transformative climate solutions and build a more just world.

In June 2023, the UK Green Building Council published its Carbon Offsetting and Pricing Report, which includes Retrofit Credits as the only UK-sourced credits issued under international standards such as the Verified Carbon Standard.

Now that we have demonstrated that our innovative carbon finance model works, this has enabled a viable financial structure to be designed to deliver the securitisation project successfully.

Figure 1 provides a process flow of a typical project where credits are generated from local retrofit projects and are sold to local buyers.

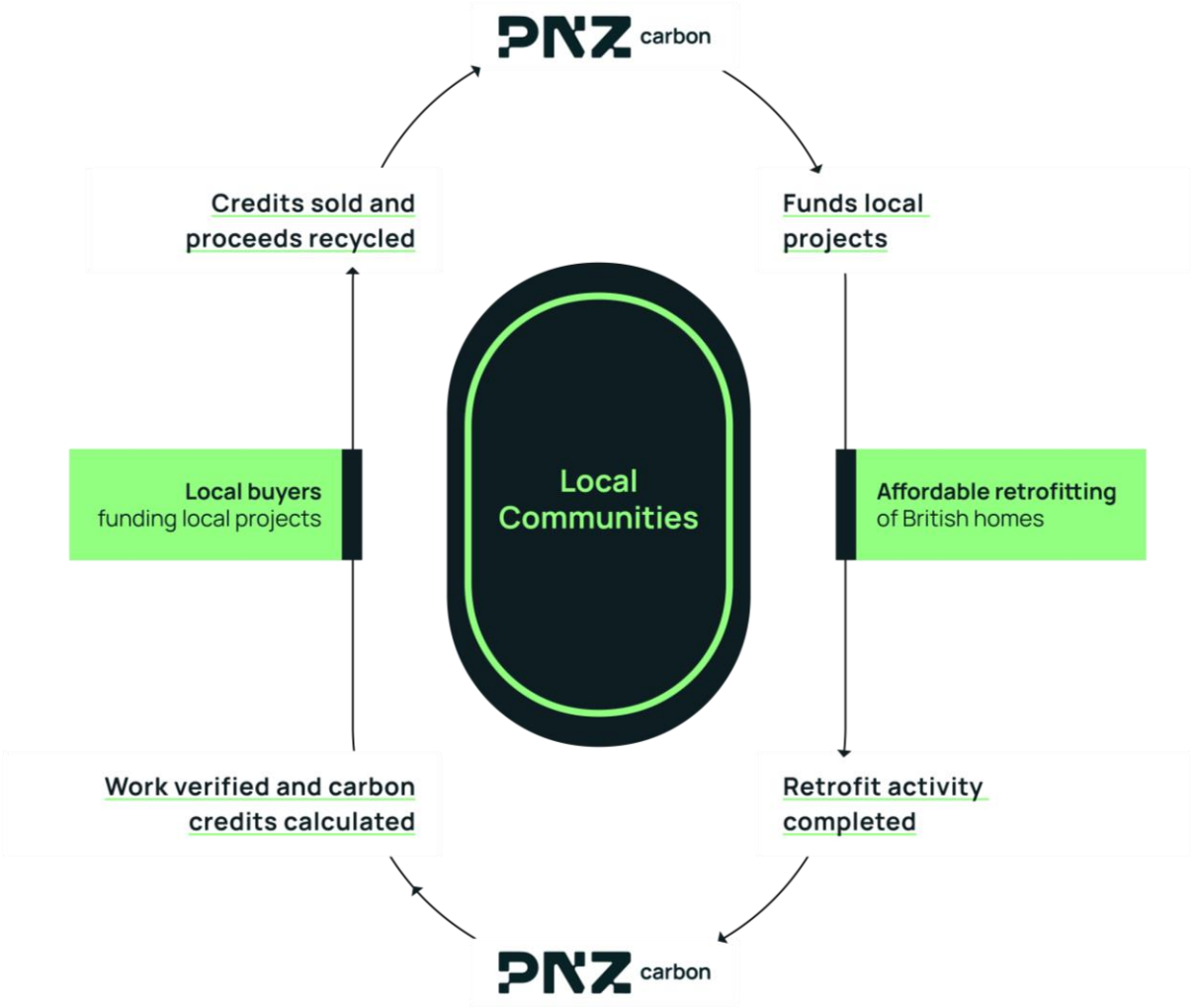

Figure 1: A typical local retrofit project

1.0 Evidence Report

1.1 Product introduction

1.1.1 Description of the green home finance product

PNZ Carbon (formerly Arctica Partners) and the Housing Associations' Charitable Trust (HACT) are facilitating the UK's transition to net zero, by funding the affordable retrofitting of British homes from the commercial demand for transparent, localised carbon credits. Our carbon credits (known as Retrofit Credits) can help fund domestic home retrofit without the need for further Government spending or the imposition of costs on households.

PNZ Carbon's methodology is the only one in the world for originating carbon credits for the decarbonisation of housing stock, and only the second UK project of any kind to have our credits certified by global standards organisation Verra.

In the current model, retrofit measures must be funded upfront before carbon credits can be generated and sold. Crediting is for up to 21 years, making this a long-term income stream. The party that has funded the installation will only receive the total value of the crediting income after completing the entire crediting period.

This project has investigated whether a structured financial product could be formulated that results in up to 10 years of carbon credit cash flows being securitised.

In the Discovery Phase, this project has successfully demonstrated that a green home finance product can be structured that results in up to 10 years of carbon credit cash flows being securitised and an upfront lump sum paid to the installer carrying out the work, enabling them to do the work at a subsidised rate for the homeowner.

1.1.2 Customer value proposition

Our model involves future cash flows from the long-term sale of carbon credits (in our case for up to 21 years) being converted into an upfront lump-sum that more closely matches the timing of the expenditure associated with the retrofit activity. This upfront payment for future generated credits is used to fund the affordable installation of retrofit activity or indeed free-of-charge installation for low and moderate-income households across the UK.

This means that funds raised from the purchase of carbon credits are channelled through our securitisation structure directly creating a closed-loop system to finance the decarbonisation of homes and supercharge the green energy transition.

1.1.3 Energy efficiency measures in scope

All forms of energy efficiency measures are in scope for our product. Retrofit measures installed during our discovery phase included insulating, air sealing, improving the efficiency of the central heating system and micro-generation measures for reducing the grid-connected electricity consumption of homes.

1.1.4 Target audience

Decarbonising owner-occupied and private rental homes largely relies on homeowners paying for home upgrades. Not all owner-occupied homes can be considered 'able to pay'. Almost half (44%) of homeowners are actively considering the retrofit of their homes; the main reason for not undertaking changes is the upfront cost[8].

By addressing the up-front costs of retrofit activity, our green finance product aims to encourage retrofit adoption amongst owner-occupier households.

1.1.5 Cost of the finance product

Our green home finance product funds the affordable retrofitting of British homes from the commercial demand for transparent, localised carbon credits. Our carbon credits (known as Retrofit Credits) can help fund domestic home retrofit without further Government spending or the imposition of costs on households.

The scale of investment needed to tackle carbon emissions from UK homes means that unlocking private sector investment will be critical to decarbonising the housing stock, to ensure that households aren't penalised in the transition.

Voluntary carbon markets are the best way to do this. This is a market in which businesses can buy, sell and trade carbon credits — which account for one tonne of carbon dioxide being removed, or avoided. High-quality carbon credits, when used effectively, can help businesses and investors reach their net zero goals more quickly and target their capital into impactful projects that make a genuine and measurable impact. There are also significant economic opportunities, with the market for carbon credits potentially worth upward of $50bn by 2030[9].

[8] Lewisham Borough Council (2022), Barriers to retrofitting privately owned homes: call for evidence

[9] **Taskforce on Scaling Voluntary Carbon Markets** (TSVCM) (2021) Final Report: January 2021. *Available online: link*

1.1.6 Information, advice, verification and any further relevant services

Rather than liaising directly with individual households, enrolment in the Retrofit Credits service is through the installer carrying out the work. Homeowners are signposted by participating installers to websites, including the GOV.UK energy efficiency advice service and the Energy Savings Trust website so they can make informed decisions about the energy efficiency work in their home.

1.1.7 Addressing consumer barriers

There are daunting obstacles to making domestic energy efficiency, low carbon heating and micro-generation home retrofit feasible for low- and moderate-income households. The high initial investment costs required, and long payback times result in adoption being focused on households with higher annual income or eligible for government support schemes.

As discussed previously, our green home finance product addresses this issue by converting the long-term income stream from carbon credits backed by retrofit activity into an upfront lump sum to fund the installation of the retrofit measures. The upfront lump sum for the carbon credits is paid to the installer carrying out the work, enabling them to fund the affordable installation of retrofit activity or indeed free-of-charge installation for low and moderate-income households across the UK.

1.2 General scoping research and other activities

1.2.1 Research methodology

The project team has interacted with over 100 organisations during the GHFA Discovery Phase, having built relationships with lenders, investors, energy efficiency, low carbon heating and micro-generation installers, and interested stakeholders.

A key highlight of the project has been the positive receptiveness of the market to the securitisation concept, particularly around our pioneering use of carbon credit revenue to accelerate housing decarbonisation.

We have also worked with over 100 organisations to help owner-occupiers access this innovative form of finance to achieve their retrofit ambitions and to ensure that everyone can benefit from affordable retrofit and its associated environmental and social benefits. We already have over 100,000 homes enrolled in our project from across the UK.

1.2.2 Benefits to low and middle-income households

Our innovative green home finance solution does not involve customers borrowing or engaging other forms of traditional finance. Therefore, deciding to enter the arrangement is relatively straightforward for the customer. As the target audience for our green home finance solution is low and middle-income households already experiencing tight everyday budgets, exacerbated by the current cost of living crisis, the decision is an economic one driven by the resultant lower energy cost outgoings.

1.2.3 Key customer lessons learnt and insights

Our research activities have focused on micro-generation retrofit adoption (solar PV). We have studied how increased micro-generation retrofit deployment can result in uneven or inequitable market dynamics, banking and financing patterns, and resource deployment[10] [11].

Once a niche technology, micro-generation retrofit has expanded rapidly in the United Kingdom over the past decade[12]. Research has identified that micro-generation retrofit is almost exclusively secured by higher-income households, creating disproportionate access to solar opportunities and exacerbating demographic inequity[13]. Compared to the broader

[10] S. Knox, et al., 2021
[11] B. Sovacool et al., 2022
[12] A. Smith, et al., 2014
[13] S. Carley, D.M. Konisky, 2020

population, adopters of micro-generation retrofit tend to live in higher-value homes, have higher credit scores, are more educated, are older, and have steady jobs.

1.2.4 Relationship and partnership building

The project is a collaboration between PNZ Carbon and HACT. The partnership was established by combining HACT's housing sector and social value expertise, PNZ's specialist knowledge of carbon reduction calculations and the carbon credits market.

Managing knowledge sharing between the partner organisations has been critical for successful collaboration. Several strategies and practices have been employed to facilitate effective knowledge exchange, such as well-defined communication channels, which included regular meetings, email correspondence, and dedicated communication platforms for sharing information and updates. There were clearly defined roles and responsibilities for knowledge sharing within the partnership.

A central information-sharing platform enableed real-time sharing and access to documents, data, and project information. The partners also held regular knowledge transfer workshops and training sessions where employees from the partner organisations could share their expertise, experiences, and best practices.

The partners regularly reviewed progress and discussed progress updates on key initiatives. This helped to ensure ensure transparency and accountability across the partner organisations.

Overseeing the project was a Steering Group which comprised the management of both organisations.

1.2.5 Finance product research

This project has investigated whether a structured financial product could be formulated that results in up to 10 years of carbon credit cash flows being securitised.

In the GHFA Discovery Phase, this project has successfully demonstrated that a green home finance product can be structured that results in up to 10 years of carbon credit cash flows being securitised and an upfront lump sum paid to the installer carrying out the work, enabling them to do the work with no upfront sum for the homeowner (the subsidy rate varies across different measures according to input characteristics such as financing costs and procurement efficiencies).

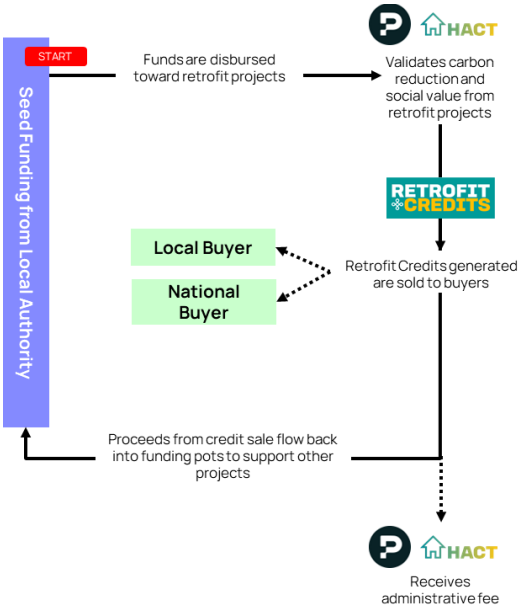

Figure 2: A process flow of how Retrofit Credits works.

During the discovery phase, this project had the following objectives:

- Identify a suitable structured finance product which aligns with projected carbon credit cashflows.
- Identify appropriate parties to participate in a structured product such as investment/pension funds or bond issuance.
- Investigate and identify organisations to receive upfront payment of credits.
- Market testing with stakeholders to refine and finalise the product.

The original objectives have not been modified during project delivery activities.

Recognising the importance of retrofit on residents' lives, we have used the UK Social Value Bank approach to measure the health and well-being impacts of housing retrofit (a process included in HM Treasury's Green Book for policy appraisal of non-market traded assets). During the GHFA Discovery Phase, we have quantified that the retrofit works which were financed through this project during the GHFA Discovery Phase achieved a social value equivalent to £2.9m annually, including savings to the exchequer.

During this GHFA Discovery Phase, we have continued to enrol installers as a conduit to the owner-occupied housing sector. We now have over 100,000 homes which are seeking funding for retrofit activities enrolled in the project from across the UK. This includes homes in rural and urban communities and from all regions and countries. Enrolment refers to homes that are expected to have retrofit measures installed with finance from our securitisation structure. Installers have either submitted details of the homes that have completed their retrofit programme along with their measures installed or those that plan to have measures installed and their expected time frame.

The other part of the discovery phase has been for us to identify buyers to purchase the credits. All the carbon credits generated during the discovery phase have been sold, with The Economist, Ibstock, Berkeley Group and Unity Trust Bank securing significant tranches. A range of other organisations also wanted to show their support of the service by purchasing smaller numbers, including Igloo, Hunters and Kinovo.

1.2.6 Alternative finance options considered

A traditional securitisation structure had originally been proposed, which would involve tranching[14] to create different credit risk categories with different levels of seniority. There would have been many risk parameters and mitigations that needed to be established and regulatory licenses obtained.

It became apparent that a more straightforward structure was possible, whereby a finance provider would provide a debt facility (or even the proceeds of a bond issuance or investment fund could be used) to convert the ten-year contractual income stream from the carbon credits into an upfront lump sum to fund the installation of the retrofit measures. The facility (or funding) would be repaid using the contractual income from the carbon credits over the ten years. This income stream would be guaranteed by the contractual commitment from the buyers to purchase an agreed number of credits per year for ten years.

This structure was clearer and more attractive to buyers of our carbon credits.

A securitisation structure involving lenders had originally been considered, whereby the lender would provide a loan to the homeowner or installer to carry out the retrofit activity. This option is not ruled out in the longer term. However, we found that working with installers on the model we have delivered was a more expedient way of impacting the amount of retrofitting activity that is happening.

[14] Tranching, is the process of dividing up the income stream into different levels of default risk and seniority, in this case income from buyers of the credits and in a typical securitisation each tranche of debt would receive a credit rating from an established rating agency.

The key regulatory consideration was to understand whether the Retrofit Credits Securitisation is a securitisation under UK securitisation regulation, requiring FCA authorisation.

This question was evaluated by taking legal advice, through which it was ultimately determined that, there is no tranching to create different credit risk categories with different levels of seniority. As such, the scheme does not fall within the definition of securitisation.

1.2.7 Advice/information research

Our green finance solution is designed to engage with low and middle-income households through a network of installers. In the current model it is installers that undertake advice and substantive research has not been undertaken at this stage.

1.2.8 Verification methodology research

The project is accredited under the Verified Carbon Standard to use three approaches to calculate emission reductions and related monitoring parameters. They are: 1) the Adjusted consumption approach, 2) the Pre- and post-retrofit energy assessment approach and 3) the Control group approach. The equations used to calculate emission reductions under each approach and the applicable monitoring parameters are listed in the Project Methodology[15].

Verification is critical to ensuring the integrity and quality of the emission reduction calculations . These processes are conducted by verification bodies (VVBs) – qualified, independent third-party auditors approved under the Verified Carbon Standard. VVBs are experts in the program and sectoral scope or technical area they audit. During verification, which ultimately validates the submission from the project allowing credits to be issued, the VVB confirms that the outcomes set out in the project documentation have been achieved and quantified according to the requirements of the respective standard.

Retrofit measures are eligible for crediting where they pass compliance. For all completed measures, the documentation required will depend on the measure involved, and includes the following types of documentation:

- PAS Certificates
- Declaration of work carried out by a person registered with a competent person scheme
- Building regulations and compliance certificates
- Gas safety certificates
- MCS certificates

[15] Housing Decarbonisation in the United Kingdom, Project Document, November 2022

- Pre- and post-installation Energy Performance Certificates or Reports

Crediting is only available where the condition of the home is adequate for project activities according to nationally recognised best practice standards and retrofit activities do not result in a violation of health and safety, environmental, or other relevant regulations. This approach was developed to provide consumer confidence and further address consumer barriers to the uptake of domestic energy efficiency measures.

The approach we have selected is efficient and proportionate because it leverages existing standards and enables consumers to feel confident that installations comply with health and safety, environmental, or other relevant regulations. Our approach is proportionate because it is tailored to the specific technologies being installed; for example, the installation of micro-generation retrofit technologies is verified through the industry-led quality assurance scheme of MCS, which demonstrates the quality and reliability of approved products and installation companies.

As the service scales, the ability to scale verification processes will also become critical. Our research has demonstrated that an integrated approach to verification is important so that solutions can often be more easily scaled to handle larger user bases or transaction volumes.

1.2.9 Marketing related research

Our green finance solution is designed to engage with low and middle-income households through a network of installers. In the current model it is installers that undertake marketing activities and substantive research has not been undertaken at this stage.

1.2.10 Future plans for green home finance

Our research has led to the development of a green home finance product that works by deploying the securitisation model for carbon credits that we have developed as part of the GHFA Discovery Phase to fund the subsidised or free of charge installation of retrofit measures for low and moderate-income households.

Through the GHFA Discovery Phase, we have assessed the barriers and enablers to retrofit, including to what extent access to our green home finance product resulted in homeowners undertaking work who otherwise would not have.

These insights are useful for shaping projections for the number of additional households who are willing to have retrofit measures installed in their homes. These insights are

informative as we plan to develop our green home finance product and the instances through which our securitisation model for carbon credits will be deployed.

The greatest barrier to domestic retrofit is funding, with many households unable to pay for work upfront. As a result, demand for local manufacturers and installers is limited by households' disposable income, which has come under even greater strain because of the cost-of-living crisis. The insights gleaned from the GHFA Discovery Phase, which we are sharing with our supply chain partners, will allow them to adequately plan for future demand.

We are collaborating with installers as part of the planning for the commercialisation of our product, and we are exploring the opportunity to co-create engagement events aimed at households and councils to showcase examples of retrofit work.

We intend to work with manufacturers, installers, local authorities and credit buyers to showcase end-to-end retrofit solutions, which include our financial product. This will provide opportunities for local SME installers to engage with potential customers and showcase their work to large procurers of goods and services, such as local authorities. Additionally, HACT has a network of over 300 housing associations across the UK and will provide opportunities through webinars and publications to introduce our supply chain of installers to this network and will share sector insights.

Retrofitting homes requires scale and volume to reduce transaction costs, create economies of scale and attract private finance. This is critical to the successful decarbonising of the UK housing stock. Through the GHFA Discovery Phase, we have identified that voluntary carbon markets are the best way to unlock private sector investment to decarbonising the housing stock, and our work during the GHFA Discovery Phase has demonstrated that carbon finance can play an essential role in helping to expedite the pace and scale of housing retrofit.