

**Adra**

**CARBON  
TRUST**

# **Adra Carbon Footprint and Decarbonisation Strategy 2020 - 2030**

**August 2020**





The Carbon Trust’s mission is to accelerate the move to a sustainable, low carbon economy. It is a world leading expert on carbon reduction and clean technology. As a not-for-dividend group, it advises governments and leading companies around the world, reinvesting profits into its low carbon mission.



Adra is a wholly owned company and is the largest housing association in North Wales and manages over 6,400 homes. As a leading provider of quality homes and services, Adra want to make a positive difference to people and our communities.

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# Foreword



**Linda Campbell**

**Tenant and Adra Board Member – Decarbonisation Lead**

Adra is north Wales’ largest housing association, with a housing stock of around 6,300. Our values are to be fair, open, ambitious and accountable. As a leading provider of quality homes and services, we want to make a positive difference to people and their communities. We are committed to minimising our impact on the environment and reducing carbon emissions from all our business activities, putting sustainability at the forefront of all we do.

Our mission is to play a pivotal role in tackling the climate crisis so that housing associations in Wales achieve a net-zero carbon footprint. We want to build a strong voice to show that people in Wales want commitment to very ambitious targets for net-zero carbon. We will do this by working with other organisations to help build partnerships of government, local authorities, companies and community groups who are willing to work collaboratively to make that difference.

We are proud to announce this strategy and our ambitious target to work towards becoming a net-zero carbon organisation by 2030. Clearly this is a very challenging target that will be highly dependent on collaboration with others, the availability of funding, technological solutions and customer support. We understand that the path to decarbonisation is not fully clear at this stage and some of the answers may be very early in their development. However, we remain fully committed to being at the forefront of this agenda and doing as much as possible to be as close to net zero as possible by 2030.

# 1. Executive Summary

Adra is north Wales’ largest housing association, and as a leading provider of quality homes and services, we want to make a positive difference to people and their communities. Adra are committed to minimising the impact on the environment and reducing carbon emissions from all business activities, putting sustainability at the forefront of all activities undertaken. In doing so, Adra have developed a decarbonisation strategy which is built on developing our own carbon footprint to measure reductions and act according to our baseline footprint findings. With the on-going climate emergency movement and the increasingly urgent need to reduce Greenhouse gas (GHG) emissions, all businesses and organisations must play their part to aid and encourage the transition towards a more sustainable, low-carbon economy.

Adra have acknowledged our role in the need to act, demonstrating our desire to provide strong core services while also growing a positive impact on the wider objectives to align with net zero Wales targets. We contracted the Carbon Trust to support us in the first stages of the journey and our ambition to become carbon net zero by 2030.

Our key drivers of developing this decarbonisation strategy to 2030 are spread across following legislation and regulation but also responding to our responsibility and opportunity for behavioural leadership with regard to almost 6,400 properties. Following recommendations from the Committee on Climate Change, in June 2019, the Climate Change Act was updated to legally commit the UK government to eliminating carbon emissions by 2050 (net zero). On the back of this, the Welsh Government has declared a climate emergency and has the ambition to decarbonise the public sector by 2030. Adra recognise this stretching national and local target requires Adra to play a part in climate change action. We also recognise the benefits of lowering our energy consumption reduces cost on our tenants, fuel poverty in general and appreciating Wales’ Well-being of Future Generation Act (see Figure 1).

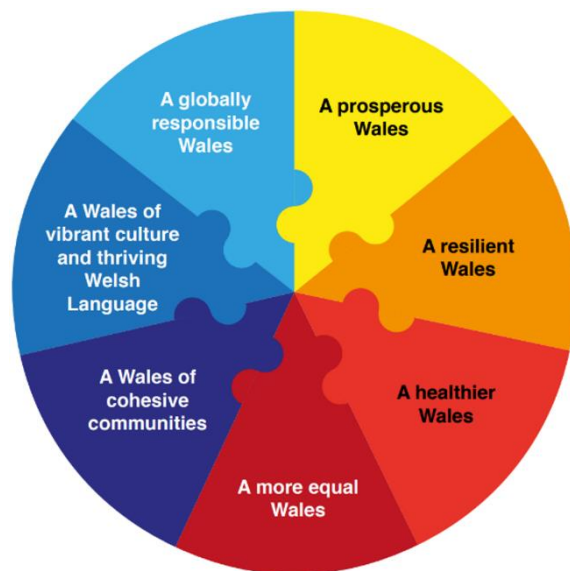


Figure 1 Wales’ Well-being of Future Generation Act

The approach Adra wish to take in this decarbonisation journey remains to be collaborative. We are well placed as an organisation to collaborate with a large number of stakeholders. In Gwynedd in particular there is a strong network of community energy companies/charities and we have already begun to work in partnership with DEG (Datblygiadau Ynni Gwledig, i.e. Rural Energy Developments) who support the community energy organisations. We are currently working on a number of exciting projects one of which has secured lottery funding and another we hope to secure funding from the North Wales Economic Ambition Board. These partnerships are mutually beneficial to all organisations as Adra is a large organisation that can provide leverage to move projects on whereas the smaller organisations have high levels of technical expertise in this field. Future staff will need training by local colleges, contractors and suppliers

working on retrofitting Adra homes will need to understand the challenges faced by Adra customers and many solutions will need to be co-produced.

Creating a carbon footprint is an essential starting point when developing a decarbonisation strategy. The Carbon Trust have completed a carbon footprint (Appendix xx) of Adra’s carbon emissions from direct and selected indirect emissions (scope 1, 2 and selected 3) with inclusion of estimated carbon emissions from housing stock for financial years 2018/19 and 2019/20 as depicted in Figure 2.

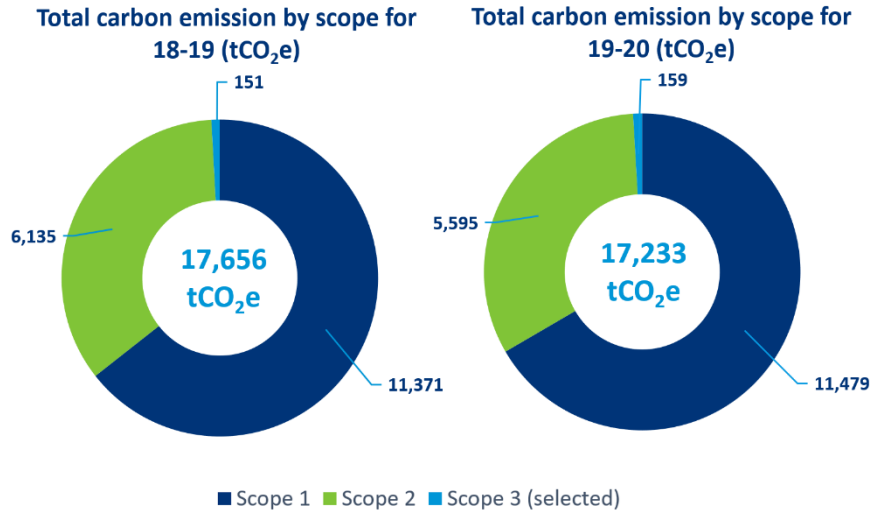


Figure 2 Adra’s carbon footprint for FY 2018/19 and 2019/20

The total measured carbon footprint for both years did not vary significantly. Around two thirds of the footprint is attributed to scope 1 emissions with 96% of Adra’s total recorded emissions came from energy consumption in the housing stock. Now that the baseline has been established, we will continue to work with the Carbon Trust to refine the process by looking at wider measures such as Adra’s supply chains. This will be a particularly important task in order to fully decarbonise and achieve net zero ambitions. The options for decarbonisation are presented in this document using a ‘hierarchy of consumption’. Avoidance and usage optimisation is at the top of the hierarchy followed by decarbonising energy consumption by moving away from fossil fuels. The remainder of carbon emissions should be offset using the greenhouse gas removal scheme as shown in Figure 3.

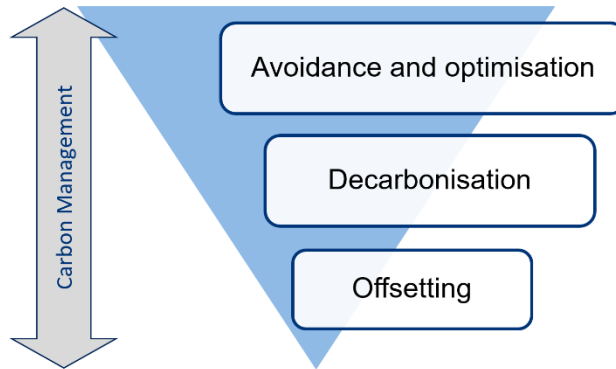


Figure 3 Decarbonisation Hierarchy of Consumption

The initial target outlined in this strategy is to achieve net zero carbon by 2030. This is an ambitious and challenging target that has a high level of constraints. We expect that setting this

target will be made on a flexible basis so as to provide the required burning platform ensuring that progress is made throughout the next 10 years and not just wait to see what funding and technological solutions transpire. The gap between current emissions and carbon zero can be closed but in practice we will need to continually review and predict what is possible each year given the funding constraints and practically how much work can be completed in any one year.

Should Adra wish to continue business as usual (BAU) electricity emissions will still decrease as a result of decarbonisation of the national electricity grid. As a result, Adra’s grid supplied electricity emissions are predicted to reduce by an estimated 3,599 tCO<sub>2</sub>e by 2030. Beyond this, a further 13,634 tCO<sub>2</sub>e reduction is needed to achieved Adra’s net zero target in 2030. Thus, the remainder of emissions will need to be tackled with actions and initiatives set out by Adra. Within the strategy these have been separated in to short, medium- and long-term actions. Short-term actions are considered as easy to implement, proven technologies without large investment needs and planning requirements such as controls, lighting and ICT upgrades (about 9% of carbon reduction by 2022). Mid-term actions are considered as measures which need a certain amount of planning and preparation, come with a larger investment but still provide a reasonable payback such as on-site renewables and fleet upgrades (about 20% of carbon reduction by 2026). Long-term actions are considered as difficult to implement and or/financed and need a considerable amount of time to be established such as the decarbonisation of heat and deep retrofit of existing buildings (about 71% of carbon reduction by 2030, see Figure 4).

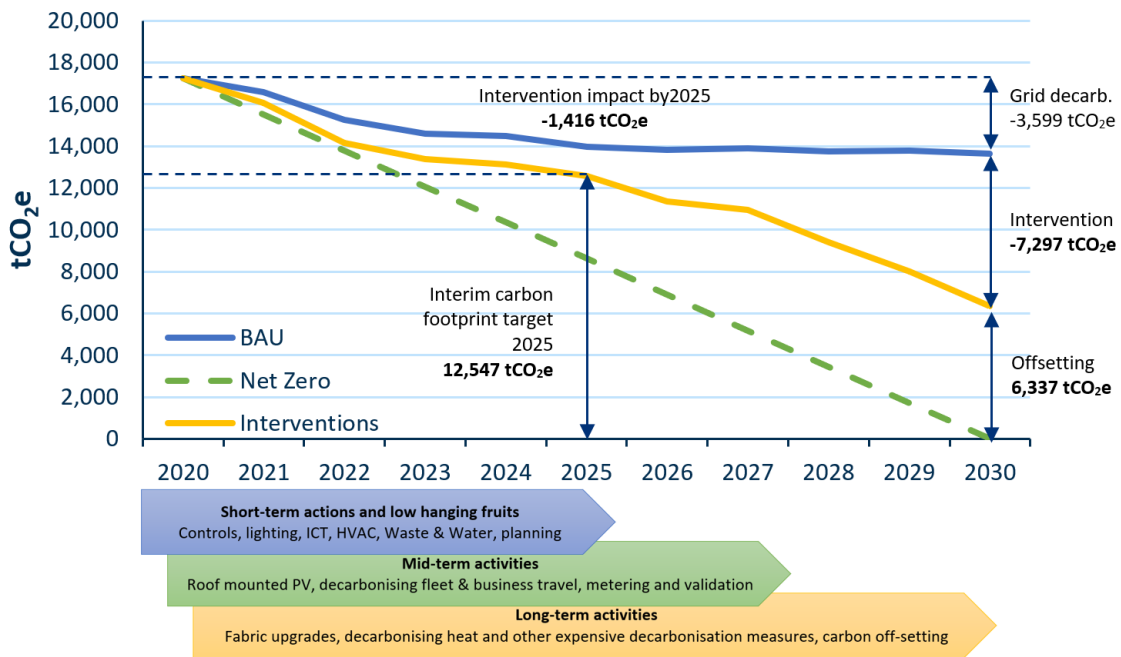


Figure 4 Adra emission forecast including decarbonisation measures

Within the strategy report a number of measures are listed for consideration. Key areas for the footprint to decarbonise occur where Adra has full control. In order to streamline activities and maximise impact, it is important to differentiate between areas where Adra is owner and operator (corporate buildings and fleet etc.) and areas where Adra has limited operational control i.e. the property is rented out and operated by the tenant (housing stock). For the latter, Adra has limited control over user behaviour and supply procurement which makes it harder to implement, maintain and monitor emissions as well as benefitting from potential energy cost savings. Buildings under control of Adra account for ~4% of the total footprint which in terms of impact for decarbonising is limiting on the overall footprint. However, this does offer solutions such as energy efficiency measures, decarbonising heat and renewable energy planning which

could perhaps be implemented in a shorter timeframe to that of the housing stock. For the housing stock (~96% of total emissions), several interventions are suggested to address each of these issues while splitting between activities which apply (i) in general; (ii) to new developments and; (iii) refurbishments. Planned refurbishments and new developments are the best opportunities to implement low carbon technologies since an investment on site has been scheduled already. In terms of energy related aspects, Adra remains responsible for the building's fabric (e.g. insulation), the provision of heat and domestic hot water.

Furthermore, Adra have highlighted a key importance that behaviour change and governance will have on the overall engagement and success of the decarbonisation strategy. For that reason, a Carbon Management Plan (Appendix B) has been developed and will be maintained as life-document for planning and tracking decarbonisation activities. It includes themes such as Decarbonisation of Stock, Energy Efficiency in Offices, Finance and Resourcing, Partnership and Stakeholder, Procurement and many more. However, it is clear that the success of stock decarbonisation cannot be viewed as only an asset management function. It needs high levels of inclusive communication (e.g. carbon literacy training, tenant's engagement activities etc.), high levels of customer and stakeholder engagement as well as the ongoing support and valuable contributions of the Adra Board and ELT/SLT members as demonstrated in several workshops (see Background Documents for workshop notes).

By adopting the 2030 Decarbonisation Strategy together with the Carbon Management Plan activity, Adra can be confident that we are at the forefront of Decarbonisation. Nonetheless, given that the technology, funding and WG position are still uncertain, we will need to view this as an iterative long-term workstream that will require us to constantly review, rethink and challenge our progress.

## 2. Introduction

Adra's Decarbonisation Strategy 2020 - 2030 and accompanying carbon footprint has been undertaken to identify the scale and prioritisation of measures to reduce overall environmental impact going forward. This strategy sets out ambitious, but achievable decarbonisation targets to 2030 and beyond. It outlines what decarbonisation opportunities and interventions are suitable, how they could be implemented and what their impact would be over time.

We recognise the need to include a wide range of stakeholders especially customers who may need a great deal of support to manage the change and disruption from the original works through to the maintenance and ongoing replacement of new technology. The Environment has been identified as a key theme within Adra's Community Strategy and Corporate Plan with the decarbonisation of business activities and the housing stock of great importance. Initial discussions began with the Future Leaders Group and subsequently the setup of Corporate Projects for the Environment and Decarbonisation with members from different departments across the organisation ensuring a cross-sectional approach. A draft environmental strategy was developed from initial ideas and input from the project board. It was then decided to work with the Carbon Trust in order to establish an accurate baseline carbon footprint for the organisation and a decarbonisation strategy.

Throughout this process, Adra have consulted with employees, customers, local energy providers and have set up an RSL climate change collaboration group. The aim of this partnership is to demonstrate a collaborative and innovative approach to the need for decarbonisation and is a group where best practice, information and ideas can be shared openly.

### 2.1 Context

The need for taking immediate and bold action on climate change is being increasingly recognised by businesses, government and the general population.

As an organisation, Adra have acknowledged our role in the need to act, demonstrating desire to provide strong core services while also growing positive impact on the wider objectives to align with net zero Wales. Adra have therefore contracted the Carbon Trust to support the first stages of our decarbonisation journey and our ambition to become carbon net zero by 2030.

Prior to the development of this strategy, the Carbon Trust completed a comprehensive carbon footprint of Adra's Greenhouse Gas (GHG) emissions from owned and controlled sources, with the inclusion of estimated GHG emissions from the housing stock, for the financial year 2018/19 and 2019/20. This essential first step has formed the baseline of targets defined in this strategy and provided an understanding of the scale of Adra's GHG emissions and identified opportunities and key areas in which to focus decarbonisation efforts. For the purpose of this report, the financial year 2019/20 is used as the baseline year.

### 2.2 Drivers for Decarbonisation

With the on-going climate emergency movement and the increasingly urgent need to reduce GHG emissions, all businesses and organisations must play their part to aid and encourage the transition towards a more sustainable, low-carbon economy. As a social landlord, Adra has a

responsibility and an opportunity for behavioural leadership with regard to almost 6,400 properties in north Wales.

In addition to this, further drivers for Adra to act on this issue are based around national legislation and regulation, organisational reputation and the cost reductions. All of which can be achieved through delivering robust action to reduce energy consumption and associated carbon emissions. These are detailed in Figure 5.

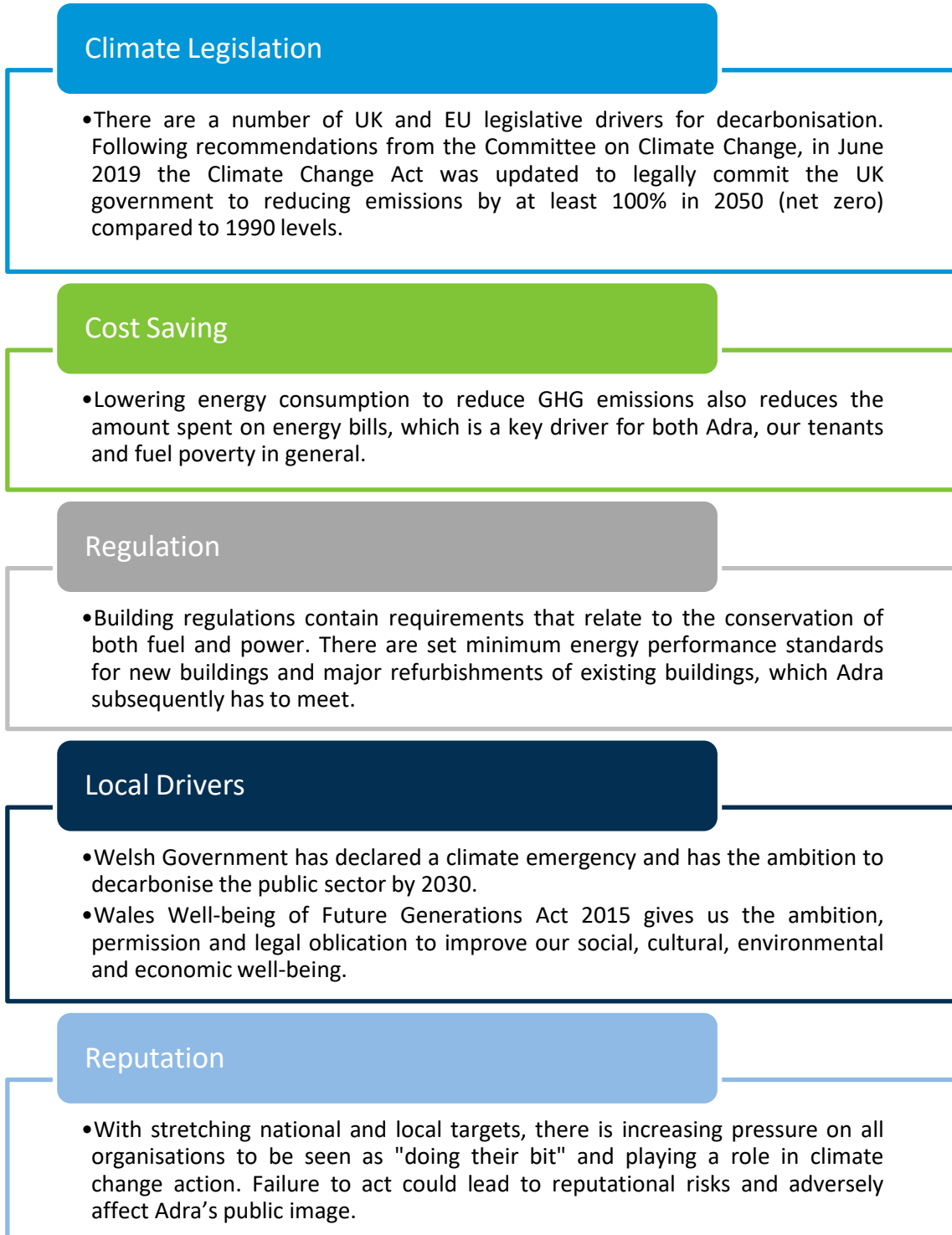


Figure 5: Drivers for decarbonisation

## 3. Carbon Footprint Baseline

Creating a carbon footprint (quantification of greenhouse gas emissions) is the essential first step in developing a carbon reduction strategy and is key to understanding the scale of the challenge and focussing efforts on the most impactful activities. In order to reduce carbon emissions effectively, it is critical to have a reference point to start from in order to understand:

- What current carbon emission sources are at present
- How much carbon emissions are emitted per source.
- Which part of the organisation is responsible for them.

The Carbon Trust has been contracted to undertake a carbon footprint for Adra which is summarised in this chapter and form the baseline for Adra's future carbon strategy. It forms an inventory of Adra's greenhouse gas emissions for the 12-month period covering the financial year 2019/20, which creates the baseline against which future progress will be evaluated. Carbon emissions for 2018/19 were also analysed for comparison. For full details on the carbon footprint, including the methodology used for the emissions calculations, please refer to the *Adra Carbon Footprint Report 2020*.

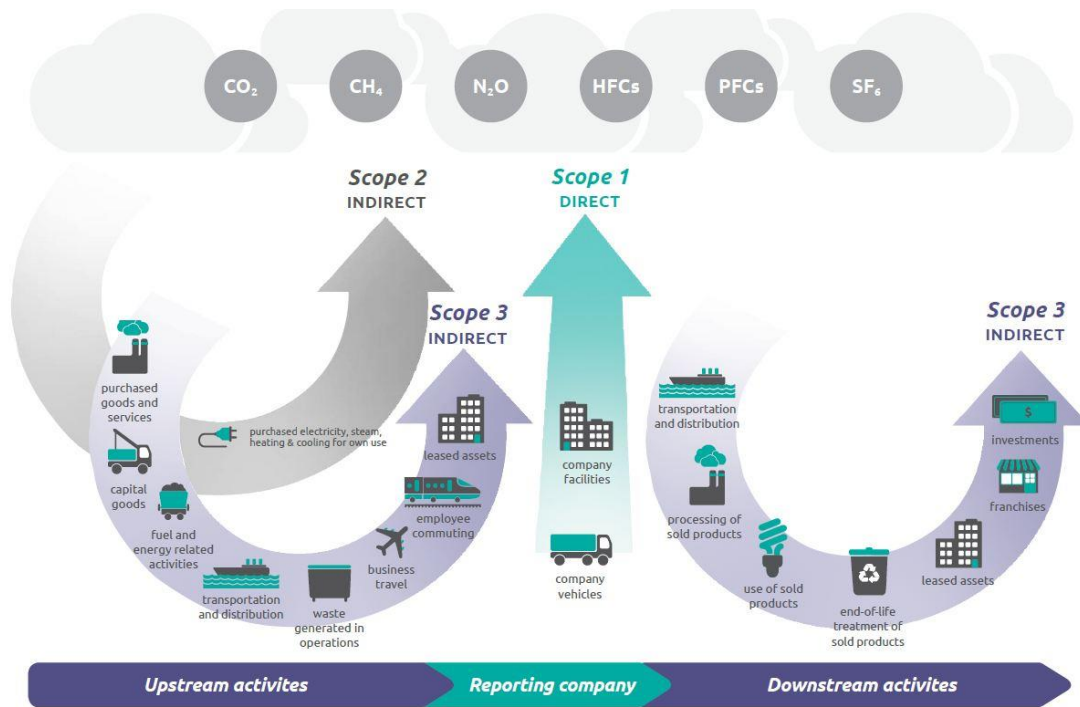
### 3.1 Footprint Boundary & Scope

Adra's carbon footprint was calculated in line with the globally accepted carbon accounting standard known as the World Resources Institute (WRI) Greenhouse Gas (GHG) Protocol. The standard defines direct and indirect organisational emissions as follows:

- Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity.
- Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity but occur at sources owned or controlled by another entity.

The GHG Protocol further categorises these direct and indirect organisational emissions into three broad scopes:

- Scope 1: Direct emissions from combustion of gas and other fuels.
- Scope 2: Indirect emissions resulting from the consumption of purchased electricity, heat or steam.
- Scope 3: Other indirect emissions, including those associated with leased assets, waste disposal, employee commuting, business travel, the extraction, production, transport and distribution of purchased materials, fuels and electricity (not covered).



**Figure 6: Greenhouse Gas Protocol – scope 1, 2 and 3 emissions**

In this footprint, Adra have opted to include all scope 1 and 2 emissions from assets we directly control, with the inclusion of those from the housing stock. In addition to this, scope 3 emissions from grey fleet, waste and water have also been included.

Although technically an indirect scope 3 emission source, Adra has chosen to include the housing stock within scope 1 & 2 emissions. Adra’s housing stock are assets wholly owned by Adra and let out to tenants who directly pay the energy bills to an energy supplier. The housing stock is included on Adra’s balance sheet.

The housing stock is the primary area for Adra that requires a high level of spending and generates a high level of revenue. Adra have control and influence over the built assets, including building fabric, heat sources, maintenance and general upkeep.

For these reasons, and following guidance set out in the GHG Protocol, it was concluded that the housing stock falls within the organisational boundary and was included within Adra’s scope 1 and 2 emissions. Table 1 details the emissions sources included in the Adra 2019/20 carbon footprint.

Consumption data for the corporate offices and fleet was directly sourced by Adra from billing data. Due to the complexity of accessing and sourcing the billing data for the housing stock, electricity and gas consumption for the properties was estimated based on published benchmarks for UK housing association and social landlord domestic average annual energy consumption by EPC rating and dwelling type<sup>1</sup> and adjusted based on average dwelling floor area and heating source.

<sup>1</sup> <https://www.gov.uk/government/publications/energy-trends-december-2017-special-feature-article-domestic-energy-consumption-by-energy-efficiency-and-environmental-impact-2015>

Table 1: Emission sources included in the Adra 2019 Carbon Footprint

Element	
Scope 1	Adra operated properties (offices) gas consumption
	Adra fleet (vans and pool cars) fuel consumption
	Adra housing stock <u>estimated</u> heating fuel consumption
Scope 2	Adra operated properties (offices) electricity consumption
	Adra housing stock <u>estimated</u> electricity consumption
Scope 3	Waste generated in operations
	Adra staff owned vehicle mileage (business mileage) fuel consumption
	Water

### 3.2 Baseline Year Emissions

This inventory is a record of Adra’s Greenhouse gas (GHG) emissions in the 12-month period covering the financial year 2019/20. GHG emissions are reported in units of carbon dioxide equivalents (CO<sub>2</sub>e). This allows the impact of each of the seven main greenhouse gasses as listed in the Kyoto Protocol to be expressed in terms of the amount of CO<sub>2</sub>. This is representative of what would create the same amount of warming, allowing easy comparison of the impact of different emission types.

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Adra’s total scope 1, 2 and selected scope 3 emissions  
in the FY 2019/20 were approximately

**17,233 tCO<sub>2</sub>e**

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Around two-thirds of Adra’s reported emissions came from direct emissions from the combustion of gas in boilers and diesel in fleet vehicles. It was also found that 96% of total reported emissions were attributed to the housing stock. The total split is presented in Table 2.

Table 2: Adra GHG emissions in 2019/20

Source	Scope 1 Emissions (tCO <sub>2</sub> e)	Scope 2 Emissions (tCO <sub>2</sub> e)	Scope 3 Emissions (tCO <sub>2</sub> e)	Total Emissions (tCO <sub>2</sub> e)
Operated Sites	119	36	---	155
Housing Stock	10,899	5,559	---	16,458
Transport Fleet (Vans and Pool Cars)	461	---	---	461
Staff Vehicle Mileage	---	---	91	91
Water	---	---	2	2
Waste	---	---	66	66
<b>Total</b>	<b>11,479</b>	<b>5,595</b>	<b>159</b>	<b>17,233</b>

### 3.3 Key Findings from the Footprint Analysis

#### 3.3.1 Scope 1 Emissions

Around two-thirds of emissions fell under scope 1, which is attributed to direct burning of fossil fuels by Adra providing heating and hot water in offices; and Adra’s owned transport fleet which burns diesel within internal combustion engines.

As can be seen in Figure 7, in 19/20 the vast majority of Adra’s scope 1 emissions arose from its housing stock which contributed **10,899 tCO<sub>2</sub>e (96%)**.

Emissions from diesel combustion in Adra’s 83 fleet vehicles contributed **461 tCO<sub>2</sub>e** and emissions from Adra corporate sites contributed **119 tCO<sub>2</sub>e**.

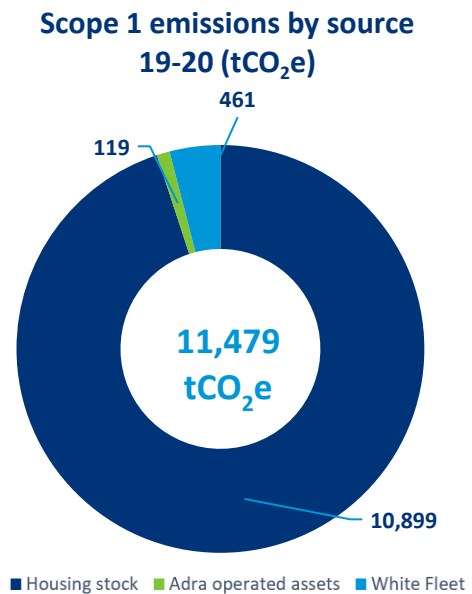


Figure 7: Adra scope 1 emissions by source in FY19-20

### 3.3.2 Scope 2 Emissions

Around one-third of total emissions fell under scope 2, which is attributed to purchased electricity. In 19/20, Adra had a scope 2 emission total of **5,595 tCO<sub>2</sub>e**, 99% of which was attributed to emissions from its housing stock.

Scope 2 emissions arising from electricity consumption in eight Adra operated office sites were calculated.

The financial year 19-20 saw a 14% decrease in emissions from electricity consumption of operated site in comparison to 18/19. Similarly, the same emissions from the housing stock decreased by 9% which is a result of the ongoing decarbonisation of the national electricity grid.

Scope 2 emissions by source 19-20 (tCO<sub>2</sub>e)

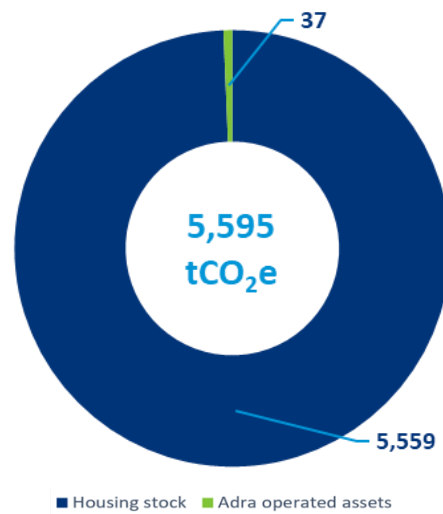


Figure 8: Adra Scope 2 emissions by source in FY19-20

### 3.3.3 Scope 3 Emissions

The carbon footprint includes emissions from business travel carried out in employee owned vehicles for Adra related business, as well as emissions associated with corporate water consumption and the downstream processing of corporate waste generated across the organisation.

In total, scope 3 emissions represent <1% of the total emissions. Staff owned vehicle mileage accounted for the biggest share of scope 3 emissions. Waste accounts for around 40% of scope 3 emissions.

Selected Scope 3 emissions by source for 19-20 (tCO<sub>2</sub>e)

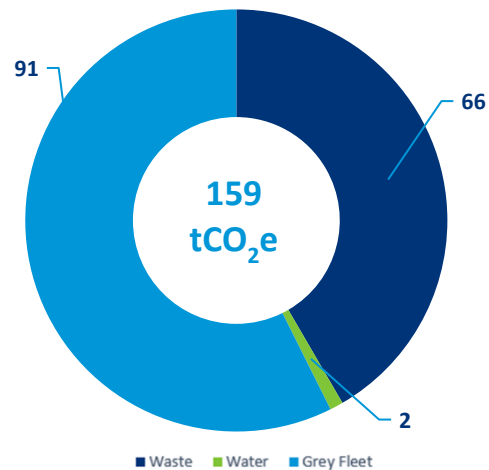


Figure 9: Adra scope 3 emissions by source in FY19-20

### 3.4 Data Validation and Future Monitoring

#### 3.4.1 Housing Stock Data Validation

Due to the complexity of accessing and sourcing data for Adra’s housing stock, electricity and gas consumption, and therefore carbon emissions, for the properties were estimated.

Estimated values can be further validated by capturing real consumption data from the housing stock at a representative sample size in future footprinting projects. This can be achieved through collecting billing data from a sample of tenants. A ‘reasonable sample size’ would include a representative proportion from each of the category combinations in Table 3Table 1. The number of occupants and floor area of each of these dwellings should also be considered (see also Section **Error! Reference source not found.**).

**Table 3: Property category combinations to target for accurate billing data**

Primary Heating Type	Amount	Dwelling Type	EPC Bands
Gas	5028	Bungalow, Flat, Terraced, Semi-Detached, Detached	A, B, C, D, E, F & G
Oil	518	Bungalow, Flat, Terraced, Semi-Detached, Detached	B, C, D & E
Electric	456	Bungalow, Flat, Terraced, Semi-Detached, Detached	B, C, D, E & F
Coal	327	Bungalow, Flat, Terraced, Semi-Detached, Detached	B, C, D, E, F & G

Collected data should be compared to the estimates calculated through benchmarks and if necessary used to adjust any previous estimates in order to increase the accuracy of the footprint. As and when additional dwelling types and EPC band combinations are added to the housing stock, representative data from these will also need to be sought.

#### 3.4.2 Future Emission Monitoring

To demonstrate and track progress, it is necessary to quantify Adra’s carbon emissions on an annual basis by employing the methodology used in the carbon footprint presented here. However, housing stock carbon emissions derived by Adra’s housing stock data base (Sava) provided very similar values. Future carbon emissions should be compared to the targets suggested in this report. The outcome of the comparison should indicate whether the measures undertaken are sufficient or need revision. This process is called a Carbon Management Plan and will be further explored. Adra will also take on the advice to include further scope 3 emissions (supply chains) in the future for a complete picture of our total carbon footprint.

## 4. Target Setting

The integral aspect of creating a strategy for Adra’s decarbonisation is the formulation of achievable carbon reduction targets over a certain period of time. The time frame is defined by the ambition to become ‘net zero’ by 2030 and the initiation of this process in 2019. Therefore, 10 years are given to decarbonise Adra by undertaking energy efficiency, renewable energy measures, low carbon fleet, and offsetting measures. Decarbonisation will also consider electricity grid decarbonisation and other factors such as rationalisation of the estate.

Adra will set and review decarbonisation targets as part of the corporate planning process. The Board/Customers and Assets Committee will be responsible for setting targets and overseeing performance throughout the year. The ELT led corporate board will be responsible for ensuring progress of decarbonisation workstreams.

Due to the rise in renewable electricity generation, the national electricity grid is set to continue to decarbonise over time and thus the carbon intensity of grid electricity will reduce. Forecasting of grid carbon intensity has been carried out independently by BEIS<sup>2</sup>. Figure 10 shows this projected grid decarbonisation up to the year 2030.

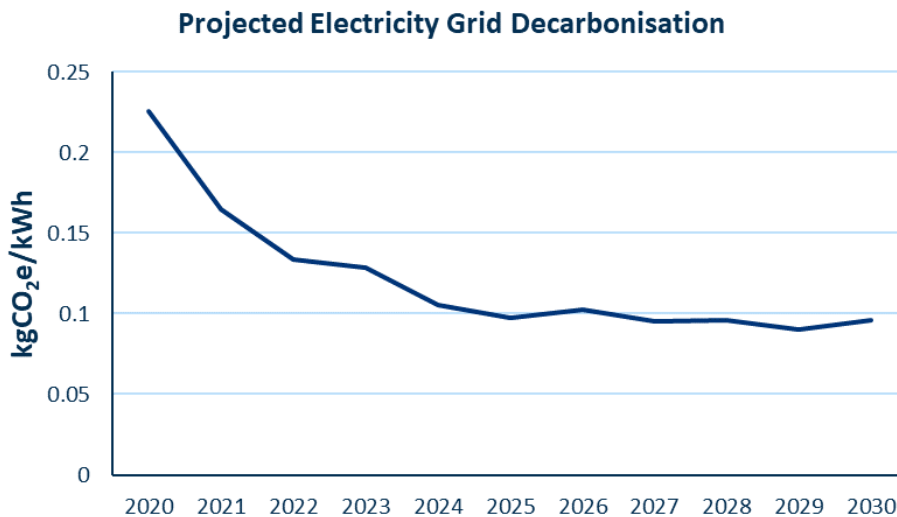


Figure 10: Projected Grid Decarbonisation

A similar decarbonisation of natural gas or other fuels/energy sources is not expected. Therefore, carbon reduction has to be achieved proactively by avoiding and optimising energy consumption as well as implementing mitigation measures such as the electrification of heat generation and energy efficiency in general.

In the following sub-sections, Adra’s 2019 carbon baseline will illustrate the ‘gap to close’ in order to be net zero by 2030 and quantify the necessary carbon reduction.

<sup>2</sup> <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

## 4.1 Adra GHG Emissions Targets

Adra have chosen to align our carbon reduction targets with the Welsh Government’s ambition to decarbonise the public sector by 2030. This target currently considers Adra’s scope 1 and 2 emissions and selected scope 3 emissions as detailed in Section 3 of this report. However, it carries a promise of strong action and embraces the need to halt global emissions.

**NET ZERO TARGET BY 2030**

**Adra will reduce carbon emissions from our activities from 17,233 tCO<sub>2</sub>e to carbon net zero by 2030**

Currently there is no commonly agreed definition of what constitutes ‘net zero’. In September 2019, the Science Based Target Initiative (SBTi), supported by the Carbon Trust, published a discussion paper containing a working definition of net zero, to inform organisational targets. The SBTi intends to incorporate feedback from stakeholders in the next iteration of the definition, alongside publication of key principles and draft guidelines which has not taken place yet. Under SBTi’s current definition, a net zero organisation must offset only through certified Greenhouse Gas Removals (GGRs). Carbon neutrality, however, is an internationally recognised term that has been commonly defined for 10 years. By aiming for carbon neutrality, an organisation can offset emissions through a range of offsets, including carbon credits.

**Table 4: Carbon Trusts understanding of Net Zero versus Carbon Neutral**

Term	Definition	Defined by
<b>Net Zero</b>	A net-zero organisation will set and pursue an ambitious <b>1.5°C aligned Science Based Target</b> for its <b>full value chain</b> emissions. Any remaining hard-to-decarbonise emissions can be compensated with certified <b>greenhouse gas removal (GGR)</b> .	Science Based Targets Initiative
<b>Carbon Neutral</b>	A carbon neutral organisation will <b>measure its carbon footprint</b> , and develop and implement a <b>Carbon Management Plan</b> (including a reduction target). Residual emissions will be <b>offset</b> by high quality, certified carbon credits.	BSI PAS 2060

Table 4 presents a definition of both terms and it will be important to keep abreast of developments to ensure that Adra is aligned with emerging best practice. ‘Net Zero’ provides the most ambitious and impactful approach for future decarbonisation, the specific requirements to consider a full supply chain and for ‘GHG Removals’ rather than ‘offsetting’ are the significant differences demonstrating an increased ambition beyond that of ‘Carbon Neutral’. However, in reflection of the understanding of Adra’s Carbon Footprint, and the extent of decarbonisation opportunity against scope 1 and 2, at this stage Adra have decided to target a ‘Carbon Neutral’ ambition. The need to evolve Adra’s ambition as progress is made is recognised. As decarbonisation progress is made against Adra’s scope 1 & 2 emissions, activity should be broadened to include supply chain carbon accounting and decarbonisation activity. This will be the first step in increasing ambition towards ‘Net Zero’. In addition, when the offsetting approach is designed, a critical review of ‘offsetting’ and ‘GHG removals’ should be undertaken regardless of whether carbon neutral is the current aim. Politically, Adra will align with Welsh Government’s approach and their understanding what ‘Net Zero’ means in Wales. In order to avoid confusion regarding terminology and remain consistent with the declared ‘Net

Zero' ambition, this strategy report will refer to a net zero approach but without taking the precise definition set out above (see Chapter 5 for further recommendations).

Figure 11 illustrates Adra's pathway to net zero carbon from the 19/20 baseline against the scenario that Business as Usual (BAU) continues (i.e. no decarbonisation action is taken). It should be noted, the BAU projection assumes that from the baseline year, there is no change to Adra's property portfolio or vehicle fleet, and that fuel and electricity consumption remains steady.

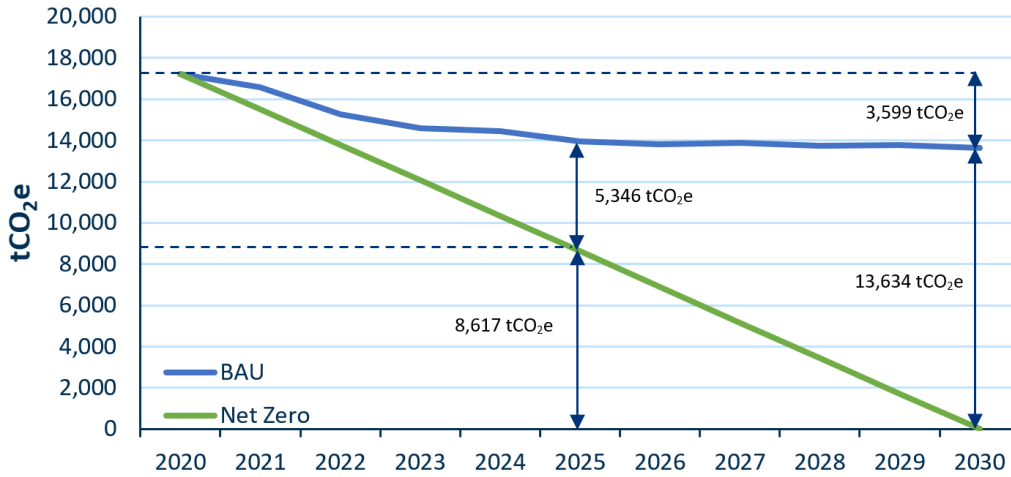


Figure 11: Adra emissions business as usual (BAU) forecast and net zero target

In this BAU scenario electricity emissions will still decrease as a result of decarbonisation of the national electricity grid. As a result, Adra's grid supplied electricity emissions are predicted to reduce by an estimated 3,599 tCO<sub>2</sub>e by 2030. Beyond this, a further 13,634 tCO<sub>2</sub>e reduction is needed to achieved Adra's net zero target in 2030. An interim target of 50% reduction by 2025 has also been identified, whereby a carbon emission reduction of 5,346 tCO<sub>2</sub>e is necessary. However, the decarbonisation targets to put forward should be realistic and derived by achievable actions. Figure 12 illustrates how Adra decarbonisation could look like.

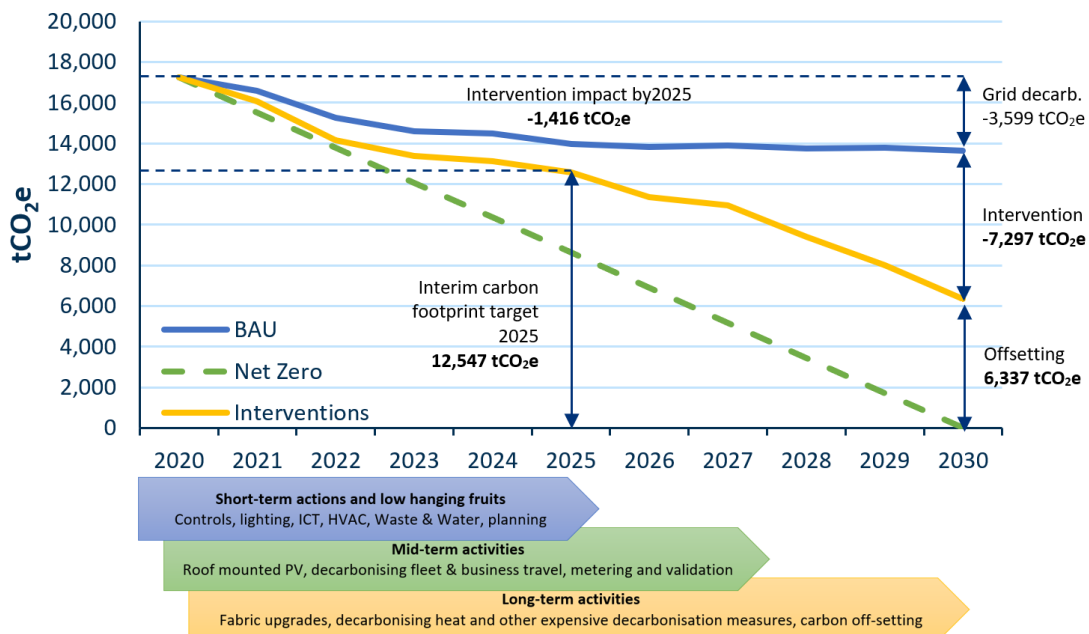


Figure 12: Adra emission forecast including decarbonisation measures

The measures presented in the following chapter have the potential to reduce Adra’s emissions by an estimated cumulative figure of 7,297 tCO<sub>2</sub>e by 2030 which is approximately 42% of the current carbon footprint. The electricity grid decarbonisation is expected to contribute about 21% (3,599 tCO<sub>2</sub>e) of carbon reduction which would leave about 37% (6,337 tCO<sub>2</sub>e) to be considered for greenhouse gas removal initiatives (or offsetting, see Chapter 5.5). The interim carbon footprint for 2025 is suggested with 12,547 tCO<sub>2</sub>e.

The decarbonisation actions can be broken down into:

**Short-term actions and low hanging fruits**  
Controls, lighting, ICT, HVAC, Waste & Water, planning

**Short-term actions** are considered as easy to implement, proven technologies without large investment needs and planning requirements such as controls, lighting and ICT upgrades (about 9% of carbon reduction by 2022).

**Mid-term activities**  
Roof mounted PV, decarbonising fleet & business travel, metering and validation

**Mid-term actions** are considered as measures which need a certain amount of planning and preparation, come with a larger investment but still provide a reasonable payback such as on-site renewables and fleet upgrades (about 20% of carbon reduction by 2026).

**Long-term activities**  
Fabric upgrades, decarbonising heat and other expensive decarbonisation measures, carbon off-setting

**Long-term actions** are considered as difficult to implement and or/financed and need a considerable amount of time to be established such as the decarbonisation of heat and deep retrofit of existing buildings (about 71% of carbon reduction by 2030).

It should be noted none of the suggested interventions have been designed in detail and the figures are indicative only. The detailed project planning is part of the decarbonisation management activity which Adra has already started working on. Figure 13 depicts the split of avoided carbon emissions per individual measure in 2030 whereas Table 5 lists the detailed implementation schedule, carbon saving potential and impact deductions applied for forecasting Adra’s decarbonisation.

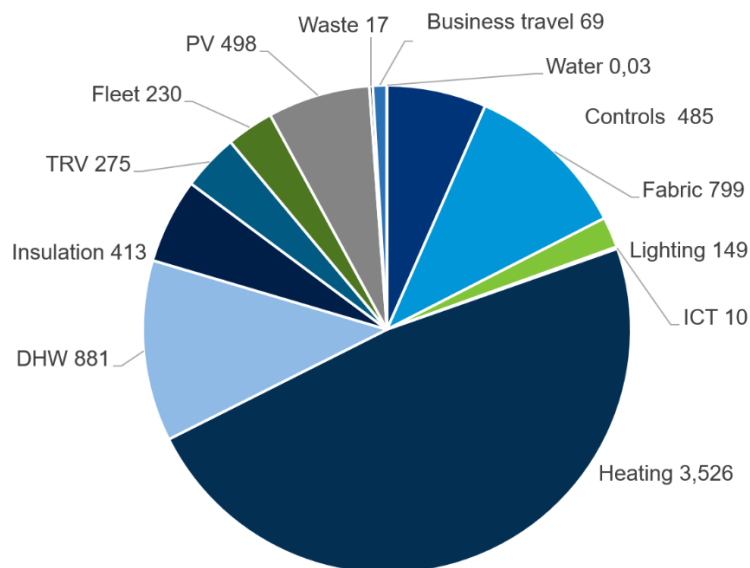


Figure 13: Split of avoided Carbon emissions per individual measure achieved by 2030

Table 5: Detailed implementation schedule, impact on scope 1 and 2 emissions and deduction factors used for forecasting

	Implementation		Impact potential factor		Deduction factors	
	Start	End	Scope 1	Scope 2	Technology	Coverage
<b>Controls</b>	2021	2023	0.25	0.25	1	0.25
<b>Fabric</b>	2026	2030	0.9	---	0.8	0.2
<b>Lighting</b>	2021	2023	---	0.3	1	0.25
<b>ICT</b>	2021	2023	---	0.05	1	0.1
<b>Heating</b>	2026	2030	0.8	---	0.8	0.5
<b>DHW</b>	2026	2030	0.8	---	0.2	0.5
<b>Insulation</b>	2026	2030	0.15	---	0.5	0.5
<b>TRV</b>	2026	2030	0.1	---	0.5	0.5
<b>Fleet</b>	2023	2026	0.5	---	1	1
<b>PV</b>	2022	2026	---	0.25	1	1
<b>Waste</b>	2022	2026	0.5	---	0.5	1
<b>Business travel</b>	2023	2026	1	---	1	0.75
<b>Water</b>	2021	2025	1	---	0.25	0.25

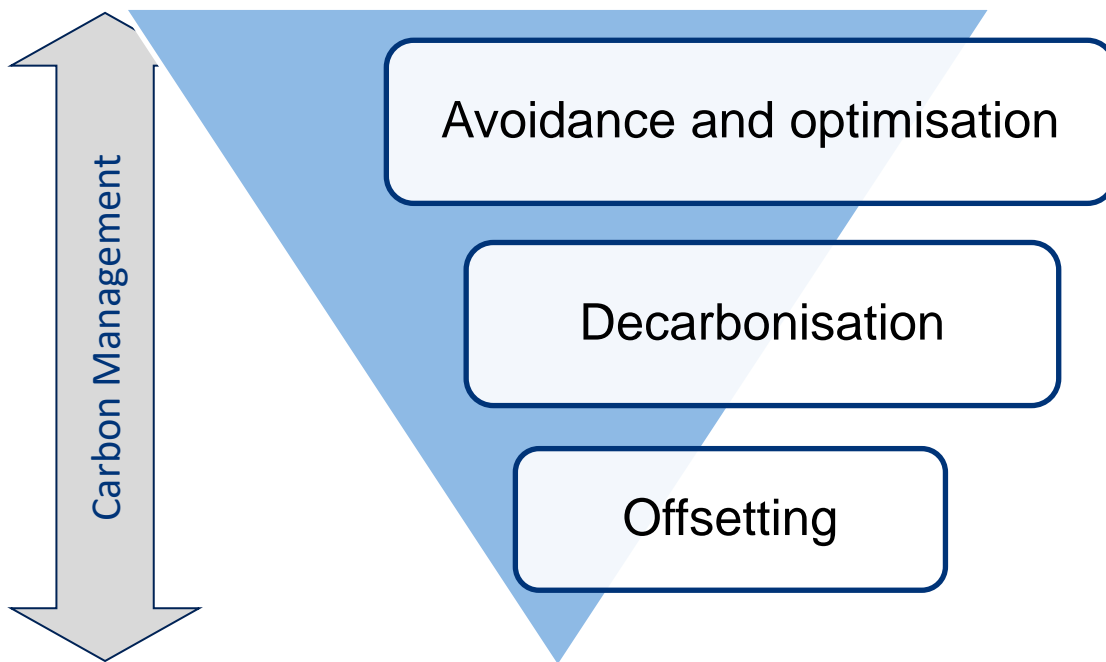
Measures which have a cumulative impact are weighted accordingly (e.g. if the fabric of a building is upgraded, the achievable savings for a heating system is reduced since the heat losses are reduced). Impact deductions are applied for technology/implementation related issues (such as limited space for a loft insulation) and objects covered (i.e. 20% of all buildings received high quality fabric upgrades by the end of the implementation phase). The factors are multiplied with the impact potential and the according scope emission in order to derive a carbon reduction figure. Further, a linear implementation schedule is assumed (e.g. if a measure takes four years to be implemented, a progress of 25% per year is assumed).

In the following section, decarbonisation opportunities and corresponding potential carbon reduction impact are presented in more detail.

# 5. Decarbonisation Strategy

Adra has built upon the Welsh Government’s declaration of a climate emergency and utilised our responsibility as social landlord to commit to become carbon net zero by 2030.

In order to achieve this ambition, a mixture of measures is available to gradually reduce Adra’s carbon emissions over time. In the previous chapter, the necessary annual carbon reductions were highlighted. This chapter aims at presenting opportunities and directive for achieving reductions required. The options are presented using a hierarchy of consumption avoidance and usage optimisation followed by decarbonising energy consumption by moving away from fossil fuels. The remainder of carbon emissions will then be off-set in accordance with GHGR as presented on the following pages. Adra should also implement a Carbon Management Plan (outlined in Chapter **Error! Reference source not found.**) which defines a bespoke set of measures for consideration in Adra’s business plan in terms of carbon savings and investment needs.



## 5.1 Decarbonisation Opportunities

There is a variety of opportunities available which lead to a reduction of carbon emissions. In order to streamline activities and maximise impact, it is important to differentiate between areas where Adra is owner and operator (corporate buildings and fleet etc.) and areas where Adra has limited operational control i.e. the property is rented out and operated by the tenant (housing stock). For the latter, Adra has limited control over user behaviour and supply procurement which makes it harder to implement, maintain and monitor emissions. It is therefore decided to split this chapter into three sections:

- i. Corporate buildings and sites

- ii. Fleet (both white and grey fleet)
- iii. Housing stock

Adra do own a significant amount of land across its sites which could be looked in to for onsite renewables. With over 3,000,000m<sup>2</sup> of land assets within ownership and management, there is significant potential for development and for offsetting projects. It has been discussed however that on the back of a social housing scheme, the remaining land left in our ownership may pose challenges due to its topography. Should our organisation wish to look in to large scale renewables, more land may need to be procured. This being said, there is an opportunity to work with agricultural land owners to pursue this initiative in alternative discussions.

### 5.1.1 Corporate buildings and sites

Buildings and sites run and operated by Adra are the assets which are the easiest to be tackled since we hold full control. However, the emission contribution accounts for just ~4% of Adra's overall emissions in comparison to ~96% contribution by Adra's housing stock which results in a limited overall impact.

The opportunities are split between,

- Energy Efficiency and Demand Reduction
- Decarbonising Heat
- Renewable Electricity and Battery Storage

and whether they are achievable in the short, medium and long term.

#### 5.1.1.1 Energy Efficiency and Demand Reduction

Energy efficiency and demand reduction occur hand in hand. If a building's loft gets insulated, old light fittings replaced with LED or room-temperatures adjusted, the energy demand reduces accordingly. It is therefore of utmost importance to start the process of decarbonising with reducing and optimising the energy demand in the first place. Over the years, Adra have identified quick wins where available. For instance, all office electricity is now on renewable tariffs and additional quick wins such as LED upgrades and insulation are on our radar to continue to pursue.

In the following, Table 6 gives an overview of technologies which should be considered for enhancing energy efficiency and ultimately reducing the building's energy demand.

Table 6: Energy efficiency and demand reduction measures

	Measure	Comment	When
Operational	Behavioural change, awareness and responsibility	Members of staff are using and operating the sites and should be included in this process.	Short-term
	Ways of Working (decarbonisation related learnings from Covid 19)	Exploring the possibilities of increased home working post the virus outbreak (i.e. reduced office usage/ need) and avoidance of business travel (i.e. video conferencing).	Short-term
	Controls	Technically up to date and well-maintained control systems which are operated by a bespoke member of staff.	Short-term
	Procurement	The procurement of goods and services contributes to carbon emissions, even if they are not captured at this stage.	Mid-term
	Metering and Verification	Understanding where energy is being used simplifies opportunity identification and forecast as well as monitoring performance of interventions undertaken.	Mid-term
Infrastructure	Fabric	The majority of space heating compensates heat losses through the fabric of a building. However, upgrades are expensive and should be aligned with planned measures.	Long-term
	Lighting	Modern LED lighting is no longer significantly more expensive than traditional lighting and worth replacing proactively.	Short-term
	ICT and other electrical appliances	Energy efficient office equipment.	Short-term
	Ventilation	Maintenance of components (such as cleaning filters) and replacing fan-motors.	Short-term
	Cooling	Avoidance where possible, heat recovery and energy efficient, up-do-date kit.	Short-term
	Heating	Besides Controls, well-maintained and up-to date kit.	Short-term

### 5.1.1.2 Decarbonising Heat

As natural gas is a fossil fuel, no significant decarbonisation of the national gas-grid is expected. There are some scenarios which predict an uptake of blending biogas and/or hydrogen into the grid but this is yet to come to fruition in an impactful way. Both scenarios are only possible to a certain extent which ultimately limits the achievable reduction for natural gas related carbon emissions without changing the given infrastructure (such as gas pipework, boilers and appliances to hydrogen combustion).

Moving away from natural gas is a challenge, both in financial and organisational terms since alternative technologies are more expensive, less familiar and potentially more labour intensive to operate. Table 7 lists common alternatives to gas boilers which are relevant to the organisation.

**Table 7: List of relevant technologies to decarbonise heat**

	Measure	Comment
Electrifying Heat	Heat pumps	Heat pumps transfer low-grade heat from the environment to different temperatures by applying work. Other applications (such as cooling) or conversion technologies (such as absorption) are also available. The ratio of heat output to electrical input is known as the Coefficient of Performance (CoP) and can reach values of 4 and above. With a minimum Seasonal Performance Factor (or annual average CoP) of ~2.5, heat pumps are significantly more energy efficient than conventional heating systems.
	Direct electrical	Direct electrical heaters are usually decentral (e.g. installed room by room) and use electrical resistors to generate heat. They can be fan supported and feature heat storage. Infrared technology is also available.
Other	Biomass	Biomass is overarching term for a heat source such as wood chips, pellets or logs. The biomass is stored on site (such as heating oil) and burned in a boiler similar to a coal boiler.
	Solar thermal	Similar to solar photo voltaic (PV), solar thermal systems entail roof mounted collectors and can support the provision of domestic hot water (DHW) and heating.
	Hybrid systems	Hybrid systems in a heating context are a combination of several heat sources such a combination of a heat pump with a gas boiler, a pellet boiler with a solar thermal system etc.

### 5.1.1.3 Renewable Electricity and Battery Storage

Adra has already utilised renewable tariffs for electricity consumption at our managed offices. The conversation around other possibilities of renewables is something Adra is looking in to as a possibility. It is important to consider for discussions any on-site renewables should be used directly for Adra properties in order to gain the maximum benefit. If battery storage would be implemented, the on-site consumption of renewable electricity would be increased and the amount of electricity fed into the grid reduced. Should Adra go down a Smart Export Guarantee (SEG) route for on-site renewables this would not allow accounting for lower emissions. The electricity feed-in tariff scheme would generate revenue for Adra and help to decarbonise the grid. Carbon savings, however, would not be deductible for Adra’s carbon footprint as they are already accounted towards national grid’s decarbonisation.

It is suggested to assess the viability of on-site renewables such as PV systems across all assets in order to quantify the carbon reduction potential and investment costs. Adra should engage with other public organisations and/or housing associations to assess PV power aided EV charging points which could support the case for decarbonising fleet.

### 5.1.2 Fleet

Adra’s fleet emissions are the highest source of work-related emissions coming from owned and managed assets. The amount of carbon emissions caused by Adra’s white fleet equated to two thirds of total emissions of that category. Currently, the make up of Adra’s fleet is primarily diesel, EURO6 standard. Driver behaviour on top of this has been encouraged along with the pursuit of enabling a telematics system to encourage fuel saving whilst driving. While this is optimal for efficiency of a diesel fleet, Adra are aware that bigger saving potentials will lie in aiming to transition the fleet to fully electric.

In terms of carbon reduction hierarchy, it should be assessed whether the amount and size of vans is matching the demand. The current market for electric LCVs is still not as comprehensive as for conventional diesel or petrol LCVs, however, there is an increasing number of makes and models available with a range suitable for Adra (Figure 14 depicts some available electric LCVs)

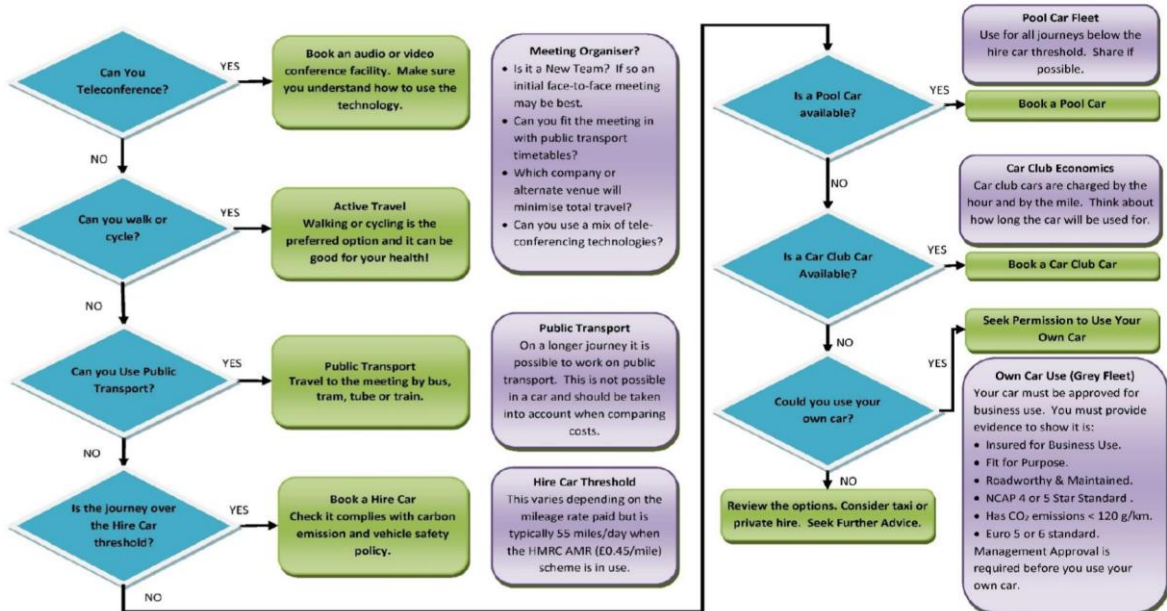


Figure 14: Examples of differently sized electric LCV available

With regard to the development of an EV fleet, Adra have discussed the importance of the infrastructure to support this being made available. The current set up of vans going home with drivers would not incentivise employees, however, it may be possible to create charging points at offices and at employees’ homes to meet the charging demand. Adra’s favoured approach is to utilise the current fleet recently purchased for a minimum of two years and re-assess the availability and feasibility of incorporating an electric fleet.

Business travel is partially considered in the current carbon footprint (scope 3 staff owned vehicle mileage emissions) accounting for claimed mileage for business travel where staff are using their own vehicles. A travel hierarchy could be introduced (Figure 15: Example of a Travel Hierarchy aiming at the avoidance of the usage of staff vehicles ) in order to reduce and ideally avoid the usage of staff owned vehicles and promote alternatives such as pool or hire cars if travel is unavoidable.

**Example Urban Travel Hierarchy**



© 2018 Gfleet Services Ltd

Figure 15: Example of a Travel Hierarchy aiming at the avoidance of the usage of staff vehicles

### 5.1.3 Housing Stock

Adra’s housing stock is causing approximately 96% of Adra’s overall carbon emissions. This value however is estimated since tenants procure energy themselves and consumption data is not captured (see Section 3). Even though Adra manages and maintains the properties, the properties are still operated by the tenants which complicates carbon emission capturing, implementation of emission reduction measures and monitoring performance.

In the following, several interventions are suggested to address each of these issues while splitting between activities which apply (i) in general; (ii) to new developments and; (iii) refurbishments. Planned refurbishments and new developments are the best opportunities to implement low carbon technologies since an investment on site has been scheduled already. In terms of energy related aspects, Adra remains responsible for the building’s fabric (e.g. insulation), the provision of heat and domestic hot water.

Table 8: List of Interventions for Adra’s housing stock and new developments

	Measure	Comment	When
General	Carbon Management Plan	Defining a bespoke set of measures for consideration in business plan in terms of carbon savings and investment.	Short-term
	Behavioural change, awareness and responsibility	Tenants using and operating the sites and should be included in this process.	Short-term
	Business model	Adra could rent out properties including energy in order to gain some degree of control and being able to capture (i.e. energy as a service).	Mid-term
	Metering and Verification	Understanding where energy is being used simplifies opportunity identification and forecast as well as monitoring performance of interventions undertaken (i.e. comprehensive asset management software).	Mid-term
	On-site renewables such as solar PV	Assess land management and work with community groups to gain a wider picture of where on-site renewables could be created on a larger scale. A key example could also be the hydro-electric with collaboration with other organisations. Assess which roofs are suitable for solar PV, assess feasibility (considering previous study) and plan implementation.	Short-term
Refurbishment	Fabric	The majority of space heating compensates heat losses through the fabric of a building. However, upgrades are expensive and should be aligned with already planned measures.	Long-term
	Heating	Electrify heat where possible. Consider alternatives such as biomass and solar thermal. Work with tenants to eradicate fuel poverty but also propose a new process in which Adra can provide a sustainable solution for tenant.	Mid-term
	DHW	Electrify where possible. Consider alternatives such as solar thermal heat pumps for domestic hot water (DHW) only.	Mid-term
	Kitchen	Eliminate gas as supply for cooker and provide electrical ovens and stoves.	Mid-term
New Developments	Planning	Avoid connection to the natural gas grid and consider sufficient electrical capacity. Assess whether ground source heat could be exploited	Short-term
	Fabric	High thermal insulation standards which go beyond building regulations.	Mid-term
	Heating/DHW and Kitchen	Electrification in general and consideration of ambient loops.	Mid-term

## 5.2 Action Plan and Impact

In contrast to the challenges associated with buildings which are not operated by Adra, once procured, the impact of measures will be similar to all of them. Figure 16 depicts a potential roadmap for Adra and visualises the implementation timeline of the previously presented decarbonisation measures.

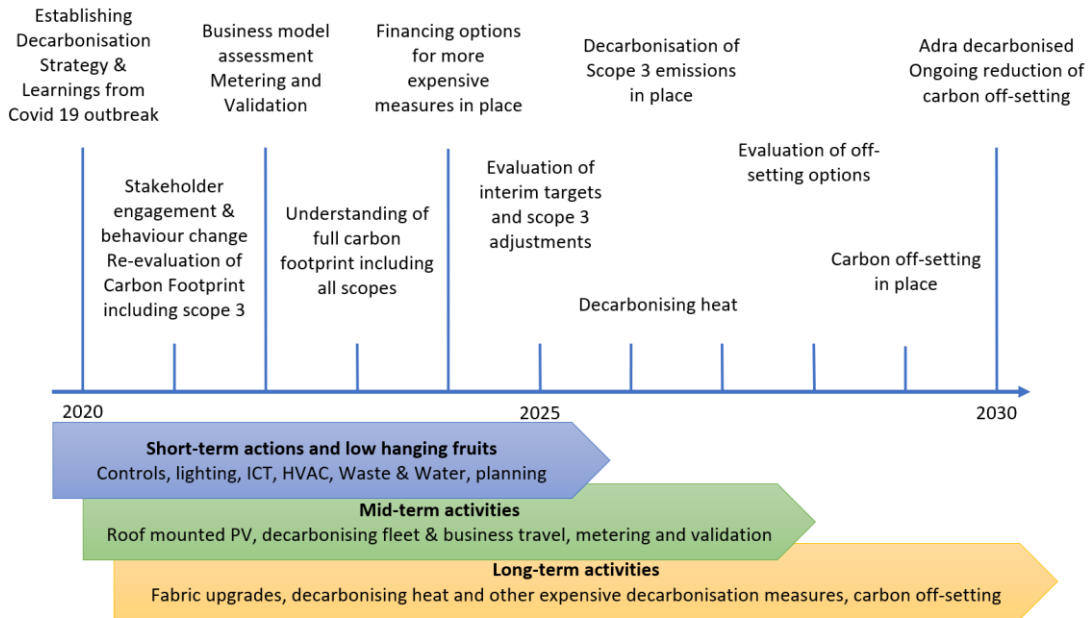


Figure 16: Roadmap of decarbonisation activities until 2030

The consideration of investment needs and bespoke carbon reduction figures for individual measures would go beyond the scope of this strategic paper and is part of the execution of this paper (e.g. decarbonisation management and detailed project planning). However, on the following pages, all proposed measures are listed including

- a description of the action needed,
- a specific carbon saving potential,
- a typical payback of investment figure,
- a comment on the potential social impact.

It shall be noted that the actual carbon/cost saving depends on several aspects such as age and condition of replaced technology and may vary significantly. **Further, a payback for an energy efficiency upgrade (e.g. change from conventional to LED lighting) will only occur if the energy cost savings are to the benefit of Adra (e.g. where energy is paid by Adra).** The carbon saving potential is given as percentage of the associated technology, not of the overall carbon emissions.

Table 9: Action Plan and Impact

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Operational	Carbon Management Plan, inclusion of scope 3 emissions and consequences from Covid 19	<p>There is no directly associated carbon saving to a Carbon Management Plan but in order to deliver measures which are aligned with Adra carbon saving targets, it is of utmost importance to evaluate individual measures and conduct them in an organised and structured manner.</p> <p>The same applies to a holistic view on Adra’s activities such as carbon emissions due the procurement of goods and services, business travel, waste etc. (i.e. scope 3 emissions). It is recommended to include all activities in future carbon footprint and decarbonisation activities.</p> <p>Further, the outbreak of Covid 19 and the associated lockdown may have a significant long-term impact on Adra’s ways of working. Adra is already evaluating the immediate impact from reduced business travel and increased home working in order to identify cost and carbon saving opportunities.</p>	N.A.	N.A.	N.A.
	Behavioural change, awareness and responsibility	<p>Similar to the previous aspect, it is difficult to associate a certain amount of carbon savings to behavioural change. However, the execution of measures depends heavily on user support and participation. It is therefore strongly suggested that Adra follow plans to create bespoke engagement plans for staff and educate tenants on the key technologies for decarbonisation, explaining the benefits / challenges and encourage for participation.</p>	N.A.	N.A.	It is assumed that the community would appreciate involvement in the process of decarbonising Adra.
	Controls	<p>For corporate sites, it is suggested to align control technology (BMS) to a single system across all sites for energy related processes such as heating and lighting. This system should be remotely overseen with respect to unusual consumption peaks and performance of technology upgrades.</p>	Up to 25%	<5 years	N.A.

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Operational	Business model	<p>Tenants of Adra’s housing stock procure energy themselves as well as they run and operate the property. This makes it difficult for Adra to monitor energy consumption and evaluate carbon performance of the individual site. It is suggested to assess whether Adra is willing to rent out the properties including electricity and heat which would allow consumption monitoring and supplier choice (e.g. energy from green or renewable sources). It would also allow Adra to benefit directly from roof mounted PV systems as the generated electricity could be sold to the tenant for a discounted rate. This measure would not directly impact on carbon emissions but would provide certainty on carbon emissions which are currently estimated and increase the level of control Adra holds.</p> <p>Another measure that has been discussed is the possibility of a decarbonisation survey for the housing stock with energy efficiency improvements.</p>	N.A.	N.A.	<p>Tenants may not want to give away the liberty of energy provider choice. Tenants would however benefit from cost savings due to Adra self-generated electricity and potentially cheaper tariffs due to scale.</p>
	Metering and Verification	<p>As part of managing the pathway to net zero carbon, the implemented measures must be quantified and compared to expected performance and carbon savings. For that purpose, a bespoke set of metering equipment is needed in order to understand energy flows and associated changes (e.g. electrical sub-meter which captures the electricity consumption of a heat pump). Further, a designated member of staff should be allocated in order to perform the necessary analysis. There is no direct carbon reduction associated.</p>	N.A.	N.A.	<p>Tenants might not want to participate in data gathering activities or sharing their details.</p>
	Fabric	<p><b>Loft insulation</b> Easiest and cheapest way of improving the thermal performance of buildings is the insulation of lofts. This should be undertaken immediately.</p>	Up to 20%	<5 years	<p>Both tenants and staff will appreciate fabric upgrades as it</p>

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Infrastructure		<p><b>Glazing and draft proofing</b> For windows and external doors which are in a reasonable state, it might be sufficient to consider draft proofing. In case of severely damaged or single glazed windows and doors, a replacement with modern double or triple glazed windows should be considered.</p>	Up to 20%	~10 years	will have a positive impact on work and life environment. A draft proofed, well insulated dwelling provides not just a healthier atmosphere but also helps saving energy costs.
		<p><b>Fabric in general</b> For existing buildings with cavity walls, it should be assessed whether they are insulated. Cavity wall insulation is straight forward to be implemented with not too much impact on the occupants. Other building types (e.g. Victorian, prefabricated or other buildings) might be harder to be improved since the façade has to be rebuilt after insulation is applied. Insulating internal walls brings the risk of damp external walls and mould growth. Upgrades of the building’s fabric is considered as part of a long-term strategy (e.g. buildings which are due for a fabric renovation anyways) and should always consider sufficient ventilation.</p>	Up to 50%	Often no reasonable payback	

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Infrastructure	Infrastructure Electricity and appliances	<p><b>Lighting</b></p> <p>The pro-active replacement of conventional lighting is financially feasible due to the reduced costs of modern LED lighting and should be undertaken immediately. However, if light fittings were upgraded less than 5 years ago, it is suggested to assess whether the replacement is i) still viable (e.g. modern T5 florescent luminaires are almost as energy efficient as LED) and ii) if the disposal of a working piece of kit is proportional to the expected energy savings (e.g. does the entire light fitting need replacement or just the luminaire). Further, the implementation of occupancy and day-light controls helps to automatically de-illuminate areas which are not used. Adra have already looked at costings and planned budget for upgrades and retrofits for some of the housing stock.</p>	Up to 30%	<5 years	In contrast to early models, modern high quality LED lamps offer superb light distribution and an excellent range of colour temperatures. It has been shown that well designed lighting improves concentration and lead to a decrease in health issues caused by poor lighting for both, employees and residents.
		<p><b>ICT and other appliances</b></p> <p>ICT equipment and other electrical appliances such as hot water kettles should be save to operate and efficient in terms of electricity consumption (high energy efficiency band) which is ensured by promoting up-to-date and well-maintained devices. Equipment which is not in use should be switched off (such as printer), equipment which is permanently not in use should be disposed. An efficient operation of electrical equipment also depends on the user who should be appropriately trained in using the equipment.</p>	Up to 5%	<5 years	User will feel more comfortable working with up-to-date, safe and efficient technology.

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Infrastructure	Infrastructure HVAC	<p><b>Heating</b></p> <p>Heat for both corporate buildings and housing stock is predominantly provided by natural gas boilers and contributes significantly to Adra’s carbon emissions. In contrast to the electricity grid, there is no significant reduction in carbon intensity expected for natural gas in the foreseeable future. It is therefore suggested to electrify heat (e.g. heat pumps) where possible and start immediately where replacements are planned already. The implementation of biomass as alternative to gas might be feasible for corporate buildings since biomass boilers come with an increased amount of maintenance which might be difficult to be fulfilled by tenants. For larger blocks of flats, local heat networks and ambient loops could be beneficial. However, natural gas and gas equipment is relatively cheap and modern gas condensing boilers operate highly efficient which is considered as barrier for more expensive low carbon heat technologies. It shall be noted that the life-time of a standard gas boiler is between 10 and 15 years and any gas boiler installed today will probably operate beyond 2030.</p>	Up to 80%	Often no reasonable payback	The operation of gas boilers is well established and the change to different technologies brings the risk of user refusal. It is of high importance to integrate future technology users in the implementation phase and educate them on how to operate new technologies.
		<p><b>Domestic hot water (DHW)</b></p> <p>DHW can be provided either on demand with gas combi boilers and instant water heater or with calorifiers which are either electrically or gas heated. It should be anticipated that DHW should be provided electrically and tailored to the demand. Alternative low carbon technologies are solar thermal and domestic hot water heat pumps.</p>	Up to 80%	Often no reasonable payback	Same as before.

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Infrastructure	Infrastructure	<p><b>Thermal pipe and fitting insulation</b></p> <p>Wherever a temperature differential occurs, thermal insulation is viable which usually applies to heating and hot water pipework. The level of insulation of pipe work in non-domestic buildings is generally of a higher standard as in domestic buildings. It should therefore be identified where heat distribution networks and fittings such as pumps, valves and flanges need sufficient thermal insulation.</p>	Up to 15%	~10 years	N.A.
		<p><b>Radiators and TRVs</b></p> <p>Radiators should always be operated unblocked and free of dust and dirt. They should further be designed and sized in accordance to the given heat losses and flow temperatures. In order to operate radiators efficiently and maintain desired room temperatures, they should be equipped with thermostatic radiator valves (TRVs).</p>	Up to 10%	~10 years	TRVs can have a significant impact on user comfort due to the provision of constant temperature levels.
	Fleet	<p>Adra have recently procured new vehicles in to the fleet which we anticipate to keep for at least two years. Whilst not EV or Hybrid, these vehicles are EURO6 and have been bought with efficiency in mind.</p> <p>In the mid/long term it is suggested that Adra replace light commercial vehicles (LCVs) with electric vehicles and assess the feasibility of charging points alongside this. The implementation should be aligned with activities from other public bodies/ other Has as the provision of charging points is essential and may not be necessarily undertaken solely by Adra. It could also lead to more cost-effective purchase deals if other parties plan similar activities.</p>	Up to 50%	Often no reasonable payback	The social impact of implementing electric vehicles are vast since no combustion gas and noises are emitted to the community. It further displays Adra's drive to tackle climate change and to reduce carbon emissions.

	Measure	Action	Carbon saving potential	Typical Payback	Social impact
Infrastructure	Renewable Energy	<p>The generation of renewable electricity is currently an area Adra are investigating. It is uncertain how much land is practically available for a larger scale renewable but Adra has good community links to utilise. There is also an additional option of roof mounted photovoltaic systems in the housing stock. Additionally, it was also discussed at a board level the possibility of hydro-electric with a partner organisation. Several different business models are available depending on whether Adra wants to own and operate the systems themselves or lease the roof space to a service provider.</p> <p>Other renewable energy technologies are biomass boiler, solar thermal collectors and heat pumps which all designed for the provision of heat.</p>	Up to 100% if not fed into grid	~10 years	Generating and providing renewable energy will be well received by the community and appreciated by tenants as it also comes with cost savings.

## 5.3 Governance and Engagement

Beyond the set of initiatives identified above, it is important that organisational changes are put in place to deliver and maintain a focus on decarbonisation and carbon management over time. This section describes the main activities and changes Adra should undertake to embed decarbonisation into the organisation.

As previously highlighted, Adra have already done work to make sure climate change strategy is becoming embedded in the organisation. This has been done through board meetings discussing key aspects required for decarbonisation strategy and a workshop to engage further staff. Both are listed in the appendix of this document.

From the previous board meeting workshop, Adra have identified that governance and engagement will be essential for the success of a decarbonisation strategy. As such, Adra have highlighted that a top down approach is essential and the organisation would benefit from bespoke training for Adra's staff. Engagement with tenants is also a high priority for Adra as the housing stock represents 96% of total emissions.

### 5.3.1 Strategy Governance

Beyond the set of initiatives identified above, it is important that organisational changes are put in place to deliver and maintain a focus on decarbonisation and carbon management over time. This section describes the main activities and changes Adra should undertake to embed decarbonisation into the organisation. Strategy Governance

The decarbonisation strategy will be managed by the Decarbonisation Project Board which is a subgroup of the Corporate Programme Board. The project sponsor is Sarah Schofield Director of Customers and Communities and the Board Champion is Linda Campbell. The scope of the Project Board and Corporate Board is to oversee the implementation of the Strategy so that the carbon reduction target is met within the timescales set out.

The Project Board has a number of key functions specifically related to carbon management:

1. To provide regular oversight and monitoring of progress towards the Adra target
2. To raise 'blockages' to the Corporate Board level where they can be removed e.g. resource issues
3. To ensure that decarbonisation stays on the high-level agenda at Adra
4. To manage the expectations of key stakeholders and recognise achievements on carbon reduction

Overall organisation of the programme will fall to Mathew Gosset Project Manager and Sarah Schofield Project Sponsor who will report project highlights, risks and issues to the Corporate Board. The Project Sponsor will have overall responsibility for partnership working, to make sure the progress of the Strategy is reported to senior stakeholders and that the projects within the Plan are delivered. The Project Manager, and colleagues, will focus on the day-to-day delivery of the programme projects.

The Project Board is also responsible for implementing the projects contained within this Strategy. The Project Board will oversee the activity within the programme which will be overseen by the Project Manager.

At Board level, Linda Campbell is the Board Champion who will ensure Adra’s focus on Decarbonisation remains a priority. Regular updates and access to the Carbon Management Plan progress will be provided for the Board Champion. The Customers and Assets committee will be responsible for overseeing progress and the Board will be responsible for the overall strategy and funding decisions.

### 5.3.2 Corporate Strategy & Policy Alignment

To ensure that carbon management is established and maintained as an organisational priority, it should be considered as part of all decision-making processes. Adra recognises that in order to achieve carbon reduction targets current practices/procedures may need to be adjusted and the consideration of carbon emissions in business as usual activities to be embedded. This includes:

**Table 10: Corporate strategy and Policy Alignment actions**

Change Action	Lead
Endorsement / sign off of this plan and the associated reduction target by Corporate Board / Adra Board	Adra Board
Publication of this Decarbonisation Strategy on the intranet and internet	Communications
Communication & engagement on the carbon management plan to Adra stakeholders	Project Manager / Communications
All business cases submitted to financial management to be appraised for carbon reduction as well as costs & payback	Project Manager / Project Sponsor / Finance
Inclusion of the risks arising from not meeting Adra’s carbon reduction target included in the Corporate risk register	Corporate Programme and Risk Manager
Inclusion of Adra’s Carbon reduction targets in Business Plan and Annual Report	Project Sponsor / Corporate Programme and Risk Manager
Review and re-alignment of all Adra Environmental Statements to take account of the Decarbonisation Strategy	HSE Manager / Project Sponsor
Review of existing policies to decide where alignment with the Decarbonisation Strategy is relevant	Corporate Projects Officer / SLT

### 5.3.3 Stakeholder Engagement & Communication

Adra will place a strong emphasis on stakeholder engagement and partnership working throughout our Decarbonisation journey. We are well placed as an organisation to collaborate with a large number of stakeholders. In Gwynedd in particular there is a strong network of community energy companies/charities and we have already begun to work in partnership with DEG (Datblygiadau Ynni Gwledig), i.e. Rural Energy Developments) who support the community energy organisations. We are currently working on a number of exciting projects one of which has secured lottery funding and another we hope to secure funding from the North Wales Economic Ambition Board. These partnerships are mutually beneficial to all organisations as Adra is a large organisation that can provide leverage to move projects on whereas the smaller organisations have high levels of technical expertise in this field. Future staff will need training by local colleges, contractors and suppliers working on retrofitting Adra homes will need to understand the challenges faced by Adra customers and many solutions will need to be co-produced. We will also need to work with Universities to develop innovative solutions and evaluate projects.

To keep decarbonisation a priority in people’s minds and behaviours, Adra need to regularly communicate with stakeholders at various levels. Effective and timely communications with staff and customers as well as external organisations is an important aspect to delivering the Adra target. Adra should do this by rolling out the following change actions:

**Table 11: Stakeholder Engagement and Communication actions**

Change Action
Develop a communications plan
Publication of the Decarbonisation Strategy on the intranet and internet
Communication & engagement on the Decarbonisation Strategy to Adra staff and tenants
Produce a Progress Report on an annual basis as part of the Adra Annual Report
Regular column in Tenant Newsletter / Clic

## 5.4 Progress Monitoring and Reporting

This section describes actions Adra should take to improve the quality of carbon emissions data, and how progress should be reported.

### 5.4.1 Strategy Progress Reporting

The progress of the Decarbonisation Strategy should be discussed and reviewed by the Corporate Programme Board, the Customers and Assets Committee and the Adra Tenant Partnership. Progress should be monitored against the targets set within this plan and the **KPIs** set out below:

#### Key Performance Indicators

- Fuel and electrical data obtained per month for each asset
- % increase/decrease carbon emissions by year
- Achievement against projected carbon savings
- Number of projects completed
- Number of projects submitted for approval and progressing towards completion.

For each meeting of the Corporate Programme Board, the progress of the Decarbonisation Strategy as a whole, as well as individual projects, should be discussed against these KPIs. It is important that Adra adopt a way of flagging the projects that are perhaps stalling or not progressing as expected. Adra should do this by using the Red, Amber & Green (RAG) risk register.

An **annual report of progress towards the Adra decarbonisation target** should be produced and presented to the Board. This report should provide an update on progress against the KPIs above and embed actions included in this strategy.

### 5.4.2 Data Management

Effective data collection has been a critical element of developing this strategy. It underpins the strategy and target and it will continue to be a critical element as Adra monitor implementation progress. Having confidence in figures, assumptions and data sources helps ensure that:

- **High priority areas are targeted:** a good understanding of where Adra emissions are coming from will allow identification of high emitters and prioritise projects that tackle these.
- **Suitable carbon reduction targets are set:** targets should be challenging but achievable to ensure maximum impact.
- **Carbon reduction projects are accurately quantified:** this will allow Adra to predict the impact a project will have on carbon emissions and how effective the portfolio of projects will be at achieving the target.
- **Business / investment cases are credible and accurate:** accurate estimations of costs and savings ensures that funds are used in the most cost-effective way.
- **The effectiveness of carbon reduction projects can be measured and demonstrated:** this allows progress against Adra target to be tracked and strengthens the business case for future investment.

- **Continuity and succession planning:** all activities should be well documented and referenced to ensure smooth hand over of responsibility.

### 5.4.3 Risks and Challenges

The main challenges/ risks we see associated with wide scale decarbonisation are as follows:

**Financial** – without external additional funding streams, Adra will not have adequate financial resources to fund the retrofit improvements to achieve the Energy Performance Certificate (EPC) A rating across the housing stock. Limited Welsh Government funding has been allocated to carry out the additional work that will be required to achieve the WG decarbonisation objective of A rated properties. Funding options are covered in more detail later in the report.

**Resourcing** - There is a risk that Adra will be under resourced to be able to plan, procure and deliver the works.

**Technical** - There is a risk of Adra and other social landlords acting prematurely and installing new inefficient technologies that could cause harm to the property and would eventually require replacing to achieve the objective.

**Limited Technical Expertise** - There is a risk that external and internal expertise to install and service these new technologies either currently do not exist or will be in high demand.

**Reputation / Customer Acceptance** – There is a high risk of customer refusal due to the invasive nature of decarbonisation work.

**Clarity and Compliance** - There is currently no clear guidance given from WG regarding how decarbonisation of the housing stock will be funded and measured and monitored to ensure compliance and whether there will be acceptable fails.

The above risks will be included in a specific decarbonisation risk register and scored accordingly. The risks will be managed via usual risk management methodology and reported on an exception basis during any future decarbonisation progress reports to Board / Committee. The Board, as part of Adra's agreed risk management methodology, review and set their risk appetite on a variety of thematic strategic areas of activity on an annual basis; decarbonisation has been identified as one such thematic area.

Scoring is based on agreed risk appetite matrix, included in Appendix C, which provides a definition for each score 1-5 within the matrix for Board members to assess their risk appetite against.

## 5.5 Carbon Offsetting and Greenhouse Gas Removals

Best practice dictates that the Adra Decarbonisation Strategy should maximise efforts to deliver action that will reduce emissions before implementing a credible carbon offsetting strategy. There may, after all actions have been deployed, still be residual emissions. This is more likely if

Adra commits to achieving a net zero carbon target before 2050. C40 Cities<sup>3</sup> recommend that, where possible, offsets should only be used to reduce scope 3 emissions. Carbon offsets should be pursued according to environmental integrity and transparency principles (real, additional, permanent, measurable, independently audited and verified, unambiguously owned, and transparent), with a strategy for identifying and managing accredited offsetting measures developed.

Offsets represent a mechanism for cancelling out residual emissions by developing, funding or financing projects that avoid or sequester GHG emissions outside Adra's organisational boundary. Organisations have been using carbon credits to offset their residual GHG emissions for well over a decade.

In recent years, the concept of carbon 'insetting' has developed, whereby an organisation invests in emission reduction activity within its supply chain, tackling GHG emissions to which they are directly related, either by geography, production or commodity. This may just be possible on buildings owned by Adra as no significant amounts of land is hold.

A range of offsetting standards exist across the voluntary carbon offset market, several of which have been criticised for 'greenwashing' due to a lack of quality projects, issues around rigour and accuracy, and reports that projects are 'non-additional' (would have happened anyway). It is generally accepted that best practice for carbon offsetting requires the selection of offset providers that guarantee Gold Standard offsets. Independent accreditations (such as the Carbon Trust Carbon Neutral Certification) only recognise Gold Standard carbon credits. Gold Standard is an internationally recognised benchmark for carbon offset projects that was created by WWF and other international NGOs in 2003, and is publicly endorsed by partners such as UNFCCC, World Bank Group, UNDP and Fairtrade.

Offsets can be divided into three main classifications:

- (1) Avoided natural depletion (e.g. avoided deforestation);
- (2) Avoided emissions (e.g. renewable energy projects); and
- (3) Greenhouse Gas Removal (GGR), including:
  - i. Natural (e.g. Mineral carbonation, ocean alkalinity, enhanced terrestrial weathering)
  - ii. Engineered (e.g. Direct air capture, low carbon concrete)
  - iii. Increasing biological update (e.g. Forestation, peatland; bioenergy with carbon capture and storage (BECCS))

GGRs require that CO<sub>2</sub> (or other GHG) is permanently removed from the atmosphere and sequestered. It is critical to ensure the permanence of such measures; the Carbon Capture and Sequestration (CCS) Protocol states that CO<sub>2</sub> must be removed for a minimum of 100 years.

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<sup>3</sup> Defining Carbon Neutrality for Cities & Managing Residual Emissions, C40 (2019)

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