

CARLESS + ADAMS



**Lean, Clean + Green –
how sustainability in the UK care
sector can help drive change**

White Paper
Written by Carless + Adams

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Abstract

In this document we will discuss how design in the care sector has the opportunity to combine the changing needs of residents with sustainable design that achieves net zero targets. This will be achieved by adapting to change, enhancing learnings and embracing new technologies.

“Architecture should speak of its time and place, but yearn for timelessness.”

Frank Gehry

Background

The UK's growing, ageing population, its changing demands of retirement living and provision around suitable accommodation all highlight that the existing retirement living community and care home stock is not fit for purpose. According to the Office for National Statistics in mid 2018, there were 1.6 million people aged 85 years and over and by mid 2043 this is projected to reach 3 million.¹ This increase in improvement in life expectancy is due to better health care and improved survival rates of premature babies, the presence of baby boomers following World War II, the next baby boom in the 1960's and general improved knowledge and availability around nutrition and healthy lifestyle choices.

Due to the historical nature in which care has grown organically in the UK, the negative perception surrounding care has meant that actual demand has been limited, and so many older people have been deterred from leaving their own homes, even though they may have become unsuitable for their needs. Designing and constructing purpose-built properties will bring a cohesive community to its heart.

Construction techniques and operations have never been completely standardised. The basic process of construction has remained relatively unchanged over the years, whilst technology used in construction has changed unrecognisably in places. With the construction sector producing high levels of carbon emissions, architects have a vital role to play in researching, introducing and educating builders on new techniques enabling a more positive impact on the environment.² The vast interconnecting constructions, materials and methodologies must all work to meet a required standard of performance. Sustainable design and green construction will ensure that only the most appropriate techniques are used.

To achieve a successful retirement living community and care home, the design will consider all aspects of the build, from the materials used right through to the natural light shining into residents' bedrooms. Every aspect is touched by architecture and built for future generations.

The Government released a white paper focussing on people at the heart of social care reform. It details their 10 year vision for social care in the UK of which housing is a criteria for success. Whilst it covers all elements of social care housing, it also specifically highlights the need to grow the supply whilst supporting innovation to help more people access such care. In relation to the older population, their white paper states that:

- + residents should be placed at the heart of the community through models such as intergenerational living or housing-with-care.
- + housing to be blended with other services on site (including residential care) so that care and support can flex according to users' changing needs.³

Growth in the development of the care sector is long overdue however we must consciously design and construct to ensure that the buildings are sustainable for our future use and are developed with this in mind. Building design can replace negative impacts with positive impacts on our environment and climate. The social value given by the building to the residents and local community can be vast. Openness to change, embracing new methodologies and technologies are all positive for the changing landscape of the care industry. It is a discussion that needs to be embraced and held across our industry. This white paper is not a definitive answer – it is opening dialogue for our sector on how to drive sustainability to be a main focus for us all.

As architects specialising in integrated retirement living and care homes, Carless + Adams firmly believe that design should marry with aspirational, yet functional requirements to help change the perception and mindset around transitioning into the next phase of life. It is an exciting time for design – embracing new technologies and methodologies, harnessing skills, focussing on sustainability, working across the project with all teams and being open to developments – all open up opportunities to create spaces that give warmth, companionship and care.

Why we've written this paper

The built environment accounts for around 40% of the world's carbon footprint. Architects like Carless + Adams and the industry as a whole have a collective responsibility to find sustainable solutions for the care sector. As specialists in the care sector, we are under no illusion, and there is a clear challenge in combining the everyday realities of utilising a care home 24/7 with available resources whilst ensuring engagement from those using the building. We also recognise the challenge faced in funding such a transformation both cost effectively and responsibly.

We feel our sector has fallen behind in delivering sustainable solutions that will help us achieve the goal of net-zero by 2050 and with ESG firmly on the agenda in other areas of construction, we are keen for our sector not to fall further behind.



The purpose of the following document is not to lead the way or suggest how it is done as we ourselves are still learning, adapting and exploring new technologies. But as we are already challenging how care is delivered in the UK there is an opportunity for such transformation to encompass a drive towards sustainability goals too. Our ambition with this paper is to start conversations and ask questions, wherever we can, in order to gather pace and for the necessary change to begin in earnest.

Foreword

The world is rapidly changing and we all need to act and help solve the climate emergency on our hands. The construction industry often comes under fire for not being sufficiently proactive in addressing issues relating to sustainability, however expert knowledge in architectural design, technological developments - plus newly discovered and invented materials and methodologies - can prove this as incorrect. These developments can actually promote a wider learning around lean, clean and green construction. This agenda is not going away so we need to discuss it, recognise the opportunities and threats, and understand any implications for care in terms of realistic costs and developments.

More needs to be actioned in the sector by embracing new advancements, and the care industry could be a driver in these initiatives. It is a moveable feast as new discoveries are made and embraced. Change is always good! Public knowledge, subsequent action around sustainability and the changes that we as individuals, companies and countries make are truly powerful. It is literally

‘people power’ that will help influence these changes and provide recognition that this is the chosen way forward.

Focussing on the design of an integrated retirement community or care home already takes into consideration so many external factors – topography, needs of the community, planning restrictions, listed or heritage status, green belts – that sustainability naturally follows suit. Carless + Adams was the first architecture practice in the UK to have a constructed design achieve PassivHaus certification⁴ and always build to BREEAM standards. Evidence based design takes into consideration these elements and the requirements with the ultimate goal being the success of the integrated retirement community and care home. It makes clear sense that we are designing to give residents their best possible lives, so why wouldn't we design using experience and materials available to us in order to give them this? It is proven that the design, layout, look and feel of a care home or IRC has a direct impact on the residents experience and their overall health and wellbeing.

The UK has been slow over the years in recognising the importance that should be placed, and resources supplied, for the older generation. As architects we take learnings, experience and innovation from other countries whose elderly care can be far more advanced. These countries have tackled the challenges that we face so it makes sense to learn from them. By looking at what is happening around us and absorbing this, learning from it and enhancing our knowledge we can work together to create cost effective, sustainable care homes and IRCs for the benefit of residents and staff.

As sustainable choices and lifestyles becomes the norm, and as the wider provision of new technologies and methodologies is made, associated costs will reduce. Designing sustainably is without doubt the way we should all be working. Future proofing the design of a care home or IRC will contribute to how sustainable it is. Remember we are designing for future generations too... which includes us!

Melissa Magee
Managing Director

Solutions + Concepts

The ultimate aim is to have a net zero carbon care home or integrated retirement community, built and operating sustainably. To achieve this within the care sector can be challenging, but not impossible with the methodology, technology and material developments that are being discovered. In fact, Inspired Villages has stated that their focus is to create net zero carbon regulated energy retirement villages. Their mission is to be the first to make these changes in the sector, get ahead of the curve, and hopefully influence others to change in the process.⁵

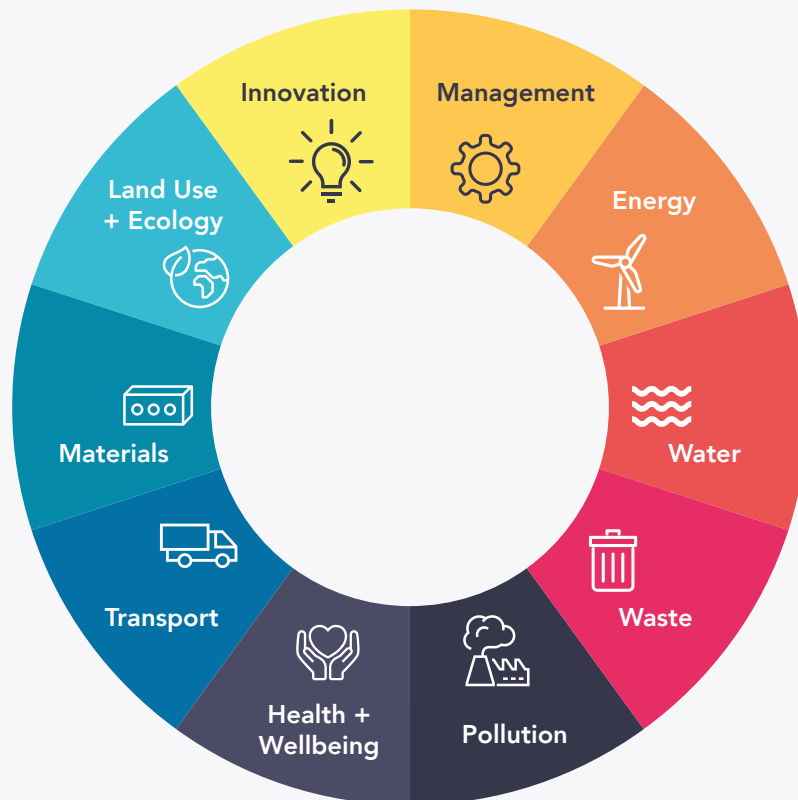
This has in part been made more accessible by changes in planning policies to incorporate sustainability and carbon reduction elements. The National Planning and Policy framework and the New London Plan both strive for sustainable development through economic, social and environmental opportunities. Avon House in Kensington, located in a conservation area, has been designed to embrace, achieve and exceed all requirements of The New London Plan, including consideration to light access for neighbouring properties and provision of green spaces to integrate the building into its surroundings, whilst giving residents the physical and mental benefits received from such landscaping.^{6,7}

Sustainability in the care sector is driven by performance to ensure that the residents and staff are catered for. The main focus must be on the needs of the residents to ensure their comfort and happiness at all time, and for the staff operating the care home or integrated retirement community to ensure that they can work without hindrance. There is a need to deliver this without fail.

BREEAM

BREEAM is the world's leading sustainability assessment method to give assurance that environmental best practice has been used in a building's development, either for new building or redevelopment. The primary aim is to mitigate the life cycle impacts of new buildings on the environment in a robust and cost-effective manner. To achieve this, architects focus on the design stage and work with construction throughout the process. Performance is quantified by measures and associated criteria across a wide range of environmental issues and expressed as a single certified BREEAM rating. Carless + Adams designed the first UK care home to achieve BREEAM for Castleoak in 2012.

BREEAM measures sustainable value in a series of categories, within which there are a set criteria to measure against:



These categories address the most influential factors, including low impact design and carbon emissions reduction; design durability and resilience; adaption to climate change; and ecological value and biodiversity protection; all of which are influenced by the architectural design at every stage of the project – from concept to design to construction to operation. This may demonstrate why we will be mentioning BREEAM throughout this white paper. Other guidance that Carless + Adams strives to achieve include RIBA Plan for Use, The London Plan, National Planning Policy Framework, LEED, UK Green Building Council and WELL Building Standard. Our working relationships with mechanical engineers, land use planning consultants, interior designers and sustainability consultants all marry to achieve the best we can for clients.

The UK Green Building Council estimates that 40% of the carbon footprint in the UK is created by the construction industry.⁸



Lean + Efficient

The Oxford English Dictionary describes 'Lean' in relation to a company or organisation as "efficient and with no wastage." With sustainability front of mind, this refers for this white paper to the lean design with subsequent construction building techniques.

The main aim must be for sustainable objectives for the planet, people and profit across the entire circular economy and supply chain whilst maximising value, reducing waste, enhancing the work process flow through planning and scheduling and to focus on continuous improvement. Just how is this achieved?

Research and planning

The construction industry is a large contributor to carbon emissions world-wide but this can be reduced significantly through the initial design. Using building modelling and evidence-based design, whilst embracing new methodologies, technologies and materials, will drive sustainability. Building modelling should be integrated at the design stage and collaboration with engineers conducted to assess the potential performance of the building. Evidence based design is the result of in-depth research, interviews with care home providers, care workers and residents, discussions with local planning officers and land owners over topography and studies on economic and social levels.

Vince Ruane of Ruane CDC agrees that the first step in any project is making clear definitions in the brief. Currently there are not any rules around this from policy and planning, simply guidelines. LETI has some great definitions but again this is not yet policy, planning or regulation just yet.

Using such analytics can challenge the traditional approaches. Imagine identifying which care home bedrooms received the greatest daylight sun and adjusting heating levels per room to avoid overheating? Digitally modelling such impacts can make the resident more comfortable and helps with reducing carbon emissions. When combined, these help Carless + Adams to design an effective, nurturing home. Using credible research, focussing on the end users and exploring all areas around the care home or integrated retirement community will create a positive environment.

Collaboration with Engineers

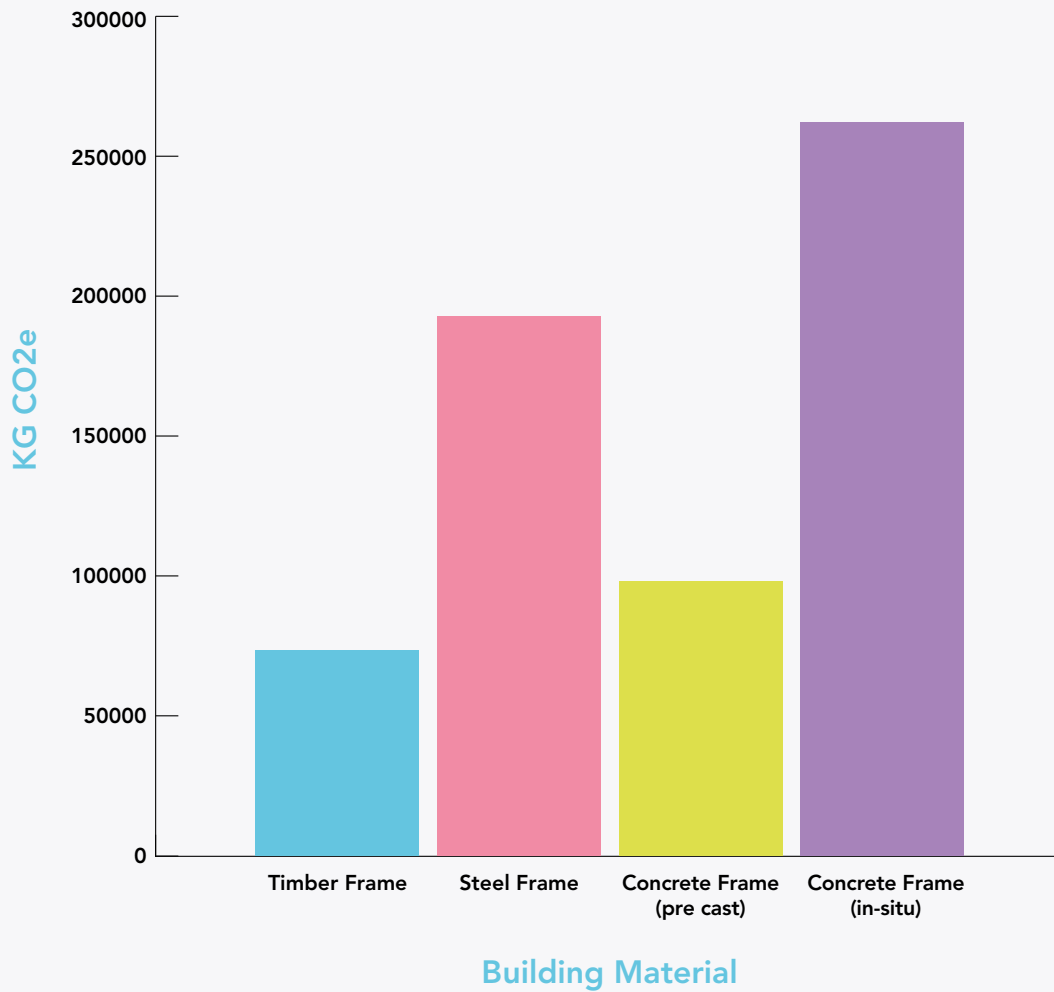
Innovative engineers can absorb the architects' design and integrate engineering needs to create low carbon designs by embracing natural elements to reduce carbon emissions from buildings. Their modelling can identify exact carbon calculations for planning, building, heating, cooling, water supply, equipment energy requirements and so on.

Carless + Adams spoke with Michael Davy of McCann & Partners who felt that the procurement and analysis of the correct material usage was imperative to the reduction of carbon in a new build care home or retirement living community:

- + Procurement – decision making in procurement can have a considerable impact on the volume of assembly, packing, transport, storage and handling of building materials and in turn the carbon emissions made as a result of this
- + Recycled material content – whilst the material selected for the build may have a high percentage of recycled content, if it has been transported 250 miles then this can be counter-intuitive!
- + Embodied carbon analysis – an analysis of construction materials at the design stage can help reduce carbon emissions. Comparing timber v's steel v's concrete at stage 2 of design would determine which would have less carbon emissions and can then be incorporated into the design.

Procurement was something that Charles Ingram Evans of Knight Frank touched on in our interview with him. He supported these views on procurement with it starting right back at finance stage of the whole project. Knight Frank has seen a shift in Banks' requirements for such projects to illustrate their very clear loan requirements. These requirements focus on environmental matters such as location, impact of climate change, ultimate operational efficiency of properties and how items are procured. Frequently the procurement of items will be influenced by local planning requirements and energy efficiency standards that need to be adhered to, so in turn this will help with the flow and credibility of the sustainability of the supply chain.

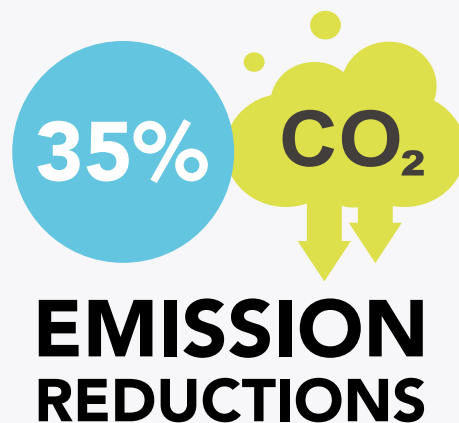
Example KG CO2 outputs per building material type



Calculations from McCann and Partners (UK) on BREEAM and the impact of production from 4 widely used building materials. Note this is based on a free time residential building of 3,500m².

Consideration must also be given to the time of development build when using different materials. Using sustainably sourced wood for example in a location where the supply is local may save many months on the build time over a concrete option and therefore revenue costs starting to recoup earlier.

Robert Moore of DSA Engineers discussed with Carless + Adams The New London Plan which states that 35% of regulated CO₂ emission reductions must be achieved onsite with the remaining emissions to be offset through a contribution to the Councils Carbon Offset Fund. This can apply across the country as there are many recognised offsetting frameworks that can be used. Robert commented that interestingly no-one has queried the 35% since March 2021 when the plan came into place and in fact many people are exceeding it. The inclusion of sustainability teams within councils may be a reason for this adherence, whereas the importance of sustainability was not examined in as much detail previously. Ensuring the details of this carbon offsetting are made publicly available would illustrate the focus made on the integrated retirement communities and care homes becoming net zero carbon, but also indicate that it is feasible for all buildings of size with suitable planning and execution.⁹



The New London Plan states 35% of regulated CO₂ emission reductions must be achieved onsite⁹

Reduction in waste comes from changes in procurement through ordering efficiently and working with suppliers to source products with reduced packaging. Onsite, construction teams know to reuse materials where feasible and to recycle where possible. Both of these elements are listed with detail under BREEAM criteria. The Royal Academy of Engineering also agrees with this as detailed in a recent report on decarbonising construction (not specifically on the care industry).¹⁰



Work Process Flow

One of BREEAM's criteria is Management. Under this umbrella comes:

- + Project brief and design
- + Life cycle costs and service life planning
- + Responsible construction practices
- + Commissioning and handover
- + Aftercare

All of these elements illustrate how careful planning for all stages of the development of the care home or integrated retirement community should be considered and implemented from the outset. Clear, concise actions and timelines for all involved parties should be written from the outset and distributed, absorbed and referred to frequently. Of course, even the best plans are vulnerable to external forces that can disrupt the flow; thus preparation is key to allowing adaptation and flexibility.

The Royal Institute of British Architecture (RIBA) has a 'Plan for Use' which provides guidance "managing the delivery of high performing, efficient and comfortable buildings". As RIBA members (and efficient workers) Carless + Adams work with process flows at every stage to achieve operational excellence and focus on sustainability. An overview of architecture services form such a process flow:

Step 1

First contact and preparation of brief:

- + Assist in establishing brief
- + Analyse site context
- + Feasibility study of sites potential
- + Attend formal pre planning application meetings with local authorities

Step 2

Design development:

- + Establish development potential
- + Refine the scheme
- + Develop chosen concept
- + Full design package submitted to local planning authority

Step 3

Technical design and construction:

- + Produce a compliant, coordinated working drawing package
- + Include specification, schedules and information
- + During construction phase, attend site meetings and advise on quality

RIBA's 'Plan for Use' provides guidance on managing the delivery of high performing, efficient and comfortable buildings.



The work process flow is present for all contractors involved and throughout the construction phase. Each stage and element of construction will have their own intricate work process flow, that integrates into the bigger overall project plan. This helps budgets, quality and timelines stay on track on projects that are often complex due to their future residents' needs.

Legislation

The New London Plan has been instrumental in focussing on CO2 emission reductions and the UK Government's ambitious target of zero gas between 2025-2035 are both key drivers towards sustainability and a green care sector. There does however need to be a focus post- construction by conducting an operating assessment to see if these legislative requirements actually work within the care sector or if a review is needed. The care sector has changed and continues to change rapidly to meet the needs of our ageing population with vastly improved methodologies and technologies since legislation was put in place. It would be worthwhile to see if there should be separate legislation to consider that the care sector has energy and carbon demands far different to any other industry. A care home may appear next to an office block as highly inefficient but there can be no comparison on the needs of the building between both sets of [inhabitants](#).

Continuous Improvement

There can be a misperception that asking your clients, customers or residents what they do well or what they do badly is intrusive and demoralising. This is far from the truth! Striving for continuous improvement can only be made by absorbing external feedback alongside internal comment. Improving every process and enhancing services that give the most value to the end users – care home or retired living community residents and staff – will also help to remove many unnecessary actions and is the embodiment of a lean methodology.

Carless + Adams conducts client surveys regularly to ask for opinion on anything from technical knowledge to ability to innovate to clients' awareness of escalation channels. We don't shy away from difficult conversations and pride ourselves in our curious approach. How else will you evolve and inspire?

Richard Branson is quoted as saying "we thrive off feedback. It helps us to innovate and disrupt, which keeps us relevant." We agree!



85%

of clients felt that C+A added to the overall value of the project



100%

of clients were satisfied that C+A had delivered against budget

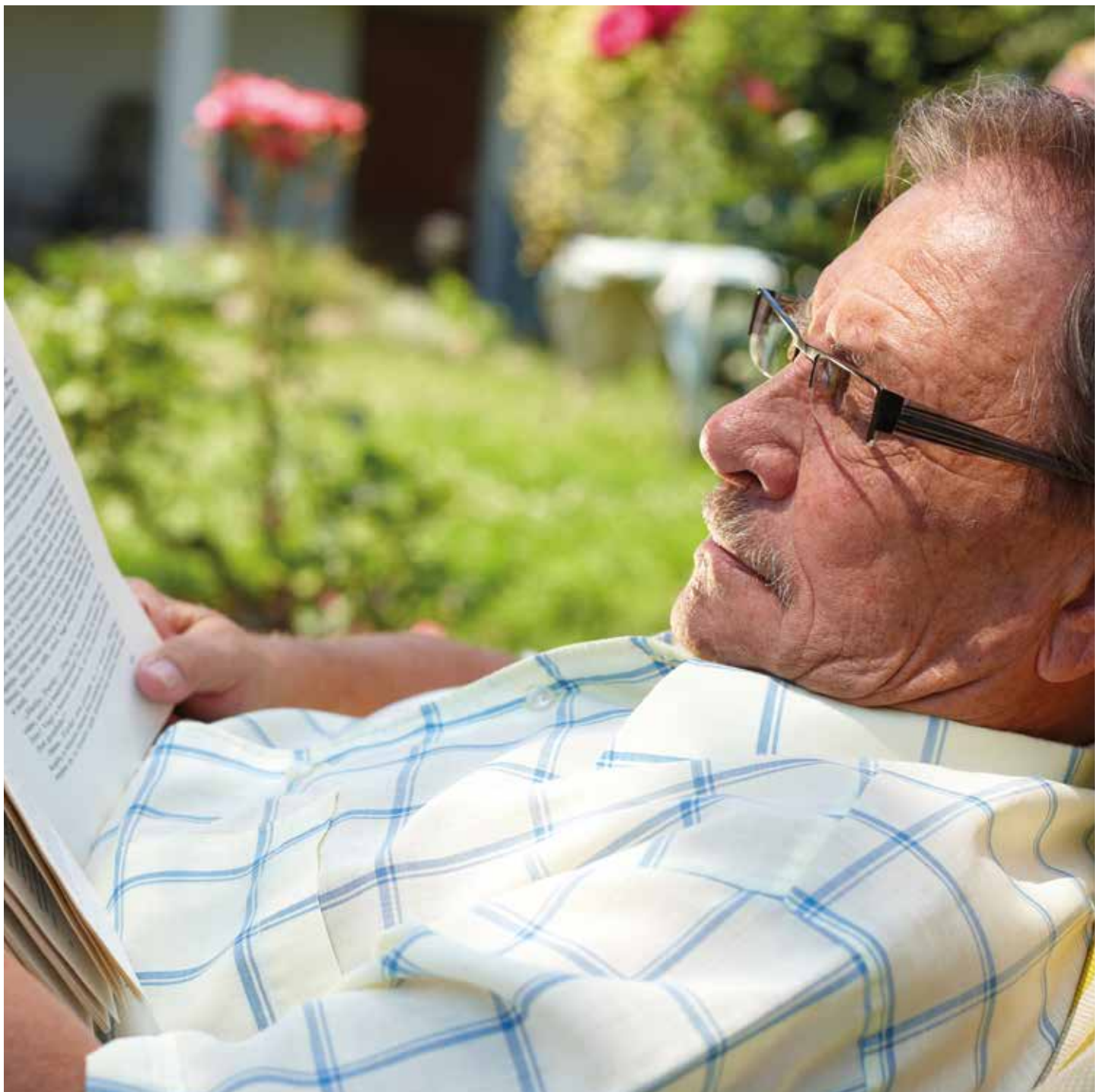


92%

of clients satisfied with communication channels

“ESG (environmental, social and governance) has gathered huge momentum in the UK over the last two years, even during the lockdowns.”

Charles Ingram Evans, Knight Frank



Clean + Healthy

When architects talk about 'clean' design, historically one might have conjured images of crisp lines or a symmetrical layout of windows. For the 21st Century architect, it should mean so much more. To design a clean integrated retirement community or care home, so many evolving factors must be considered with a firm focus on the future as well as the present as the needs of residents change and new technologies become available. These technologies can be exploited by individual care homes or IRCs to the advantage of the owners, the carers, the residents and, of course, the environment.

“There is a positive progression to achieve ESG levels which shows the change in the care industry towards a sustainable focus.”

Silas Campbell, Blueleaf Care



Charles' statement is echoed by Silas Campbell of Blueleaf who explained how there is demand from investors to focus on ESG but that this is being matched by operators who are keen to achieve ESG levels rather than just 'box ticking'. This is a positive progression and shows the change in the care industry towards a sustainable focus. Maybe this trend is here to stay as learnings have been gained from other sectors who are able to implement ESG credentials sooner due to finance availability. Savills reports that commercial property, specifically offices, focus on assets being permanently attractive, which means keeping abreast of regulatory changes and tenants' demands. Such space therefore consistently exceeds standards in ESG regulation in order to remain lettable at all times. Being able to utilise these learnings and transfer them to the care sector is invaluable.¹¹

Cost is always a consideration when embracing new technologies. Pioneering technologies can have hefty price tags attached to them but as these become more mainstream so should the associated costs. We also need to consider initial cost versus long term sustainable use. Being strategic with design, build and operation will set the care home or IRC apart from others. Cost of care is continuously a hot topic, and will continue to be so as our population ages, however it would be naive to not embrace new clean technologies as they will provide longevity. At the ARCO Annual Conference¹² it was stated there is a 7% uplift in cost of build of which is apportioned as 40% fabric first, 40% heating, 20% PV's. However, overall a building designed this way will achieve a 34% gain on energy efficiency.

Clean, sustainable design may not be what initially attracts residents and their families, but the client satisfaction and return on investment, that can be passed onto them, will be, notwithstanding the responsibility on us all to transform the way we impact the environment.

Examples of clean technologies embraced in the care industry include:

Active Building Systems

The definition of an active building system is that they capture, store and share energy providing a significant reduction in energy use and carbon emissions. The buildings can be designed to generate and store renewable energy for their own consumption and also redistribute back to the grid.

The Active Building concept was conceived by the SPECIFIC Innovation and Knowledge Centre, at the University of Swansea with their first design and build demonstrations in 2017. These demonstrations tested and continue to prove a range of energy and digital technologies, as well as show how these technologies can be connected in one integrated system, working together to generate heat and power for the building, and where appropriate for associate vehicles and the local grid.¹³

Even high energy demand care homes and IRC's can use the active building system to their benefit through a range of design considerations and embracing the different technologies emerging and those that are available:

Building Design

Working in conjunction with the passive house system, the design should be made with the residents' and care workers' comfort in mind whilst focussing on low energy usage. The architectural process of massing, uses orientation of the proposed building to determine efficient materials to be used, embracing natural daylight and ventilation. This integrates engineering approaches and architectural design.

Energy Efficiency

The provision of energy at a care home and IRC is vital for the wellbeing of residents. The demand placed on energy consumption is vast so designing for the inclusion of an efficient and intelligently controlled system is vital. Managing the flow and minimising loads can be achieved through heating, ventilation and air conditioning (HVAC), lighting and how the electrical system transports electricity around the building. By analysing how this is used, distributed and continuously monitored helps to optimise usage and predict peak times. Within a care home or IRC there are obvious peak times – waking, mealtimes and preparing for bed – that places demands from numerous residents on the system so there cannot be an interrupted supply causing upset and distress to the residents and issues with workload for the care workers.

Renewable Energy

By generating onsite renewable energy the reduction of carbon emissions and reliance on fossil fuels is removed. The consistent demand for energy is compatible with the way that sustainable technologies with renewable energy runs so provides cost efficiencies too, which is beneficial where 'traditional' energy methods are rising dramatically. By using renewable energy this indicates that the care home or IRC is investing in its sustainability with a long term development plan.

The UK's use of renewable energy has increased dramatically and demand for carbon reduced - more energy was generated in the UK in 2019 from zero carbon emission sources than fossil fuels.¹⁴

In June 2020 the UK achieved a significant milestone by going coal-free for two months.¹⁵

This monumental achievement is a first since the start of the Industrial Revolution but needs to be just the tip of the iceberg.

The main forms of renewable energy that could apply to care homes and IRCs are:



Solar: care homes and IRCs are generally large buildings and therefore have the roof surface area to install solar photovoltaic panels. Utilising an onsite battery will ensure that this power can be stored and used overnight or whenever needed. Vince Ruane of Ruane CDC stated that about 70% of a roof on average can be used for PV's and these can also be integrated with green roofs.



Wind turbine: available land will be the determiner for this type of renewable energy but should be factored into new builds when the space is there.



Biomass: there is a large amount of organic waste that comes with feeding large numbers of people (fruit and vegetable peelings, any food removed during the preparation process, uneaten food from residents or staff) and can also be supplemented by wood. The Wood Heat Association assigned to focus on this by the REA (The Association for Renewable and Green Energy and Clean Technology) states that "bioenergy from sustainably managed forests can contribute positively to climate change mitigation".¹⁶



Air and Ground Source Heat: by extracting heat from a natural source (the ground or air) and concentrating it to obtain a higher temperature which is then used to heat rooms and also water. A true renewable, the supply is constant and inexhaustible, and when running it is virtually silent. The ongoing maintenance of these pumps after installation is minimal which adds to the benefits for the care home or IRC in terms of skill sets and manpower hours required to maintain the system.

Within a care home or IRC setting, the ground space available is large, especially when outside ground is also utilised. All new build care homes and IRCs will have landscaping factored into the design and build so digging up vast areas of land to install the cabling is not an issue. At the moment as the technology is being developed, biomass generally operates at a lower temperature which needs to be considered when heating residents' communal areas and providing water hot enough to eradicate any water born diseases. Currently this often requires a 'top up' by alternative methods so developing the care home or IRC with numerous renewable sources is ideal.



Bore holes: these would be part of the ground sourced heat pump system but technology needs to be enhanced for these before they can be used widely in the care sector. **Inspired Villages is already spearheading this technology for their care homes and integrated retirement communities.**¹⁷

Care Homes and IRCs have consistent high levels of demand for energy. Designing care homes and IRCs to include renewable energy generation where feasible is the ideal way to cut carbon emissions but also to cut running costs. Additional techniques such as green walls, rain water harvesting, grey water usage, insect hotels all add to the sustainability of the project. Embracing clean technologies and designing their use holistically will not only improve efficiencies but can have a highly beneficial effect on the residents' wellbeing. In our interview, Charles Ingram Evans of Knight Frank spoke about how the move to green energy has been huge in the last 2 years in the office sector. He noted that restricted access to care properties has meant contractors have been unable to come onsite to make the switch to green energy during the pandemic.

Energy Storage and Conservation

Designing, installing, managing and analysing data from electrical and thermal storage will help to mitigate peak demand, reduce requirements to oversize systems and offer greater control on the usage. Care homes and IRCs have a highly cyclical schedule, so energy usage can be accurately forecast to avoid any interruption to the supply during peak usage.

“After clear definition, the second most important thing when starting a project is setting clear targets such as EUI.”

Vince Ruane, Ruane CDC



Electric Vehicle Integration

In 2018, the transport sector became the largest source of emissions in the UK, surpassing the power sector.¹⁸ The development of electric vehicles in the UK is moving swiftly and the development of batteries, the charging infrastructure and new models of cars and vans will help develop the Government's long term aim of decarbonising transport.

Whilst care home or IRC residents probably won't be using their own vehicles, the care workers, visitors and suppliers will do. Designing a building to integrate electric vehicle charging capability illustrates this focus on sustainability. In the very near future, bidirectional charging will allow electric vehicles to deliver energy to buildings and vice versa. Obviously to be completely carbon conscious the initial charge of the electric vehicle needs to be from renewable sources.

Integration with National Energy Network

Care Homes and IRCs that have been designed with an active building system should also be capable of interacting with the national energy network to ensure that any dip in energy supply does not interrupt the needs of the residents. The example given of biomass not yet reaching high enough temperatures illustrates the importance of this for the health of the residents.

District Heating

Scandinavian countries benefit from district heating and the UK Government launched an initiative in 2018 to extend district heating capacity, driven by local authorities, across the UK. There are currently 17,000 district heating networks in the UK.¹⁹ The UK Government also has a non-domestic Renewable Heat Incentive (RHI) to provide required financial input to the sector.²⁰ Newly designed and built sustainable care homes and IRCs would be classed as community heating if the energy requirements are only for the care home or IRC and a number of other residential homes. While not as impactful as district heating, this would be beneficial to the sustainability credentials.

Passive Building Systems

The Passive building system is a standard of building design that focusses on keeping the heat in a building through efficient design, therefore reducing the energy needed to heat a building in the first place. Known in Germany as Passivhaus, this standard was invented in Germany by Dr Wolfgang Feist 30 years ago, born out of his awareness that fossil fuels as an energy source for residential homes had a time limit and were causing huge climate issues. Utilising his network of scientists and architects, Dr Feist investigated how to address unsustainable and unhealthy buildings whilst keeping the construction economically viable. Passive House is now one of the world's leading standards in energy efficient construction. More details on Dr Wolfgang Feist's development of the original Passivhaus can be read at The Passive House Institute website where many of the initial principles still stand today.²¹

Many factors go into making a passive house but the key principles are:

Insulation

A continuous layer of insulation must be around the building without any thermal bridges. This may mean that the cavity wall needs to be thicker to allow for this. Windows should be triple glazed to reduce draughts so a warmer home perfect for the elderly, reduction of outside noise which if the care home or IRC is located on a main road or areas overlook loading bays, is welcoming for the residents and can help **if there is** condensation **to reduce it**, which in turn could lead to a reduction in illnesses alongside increased energy efficiency.

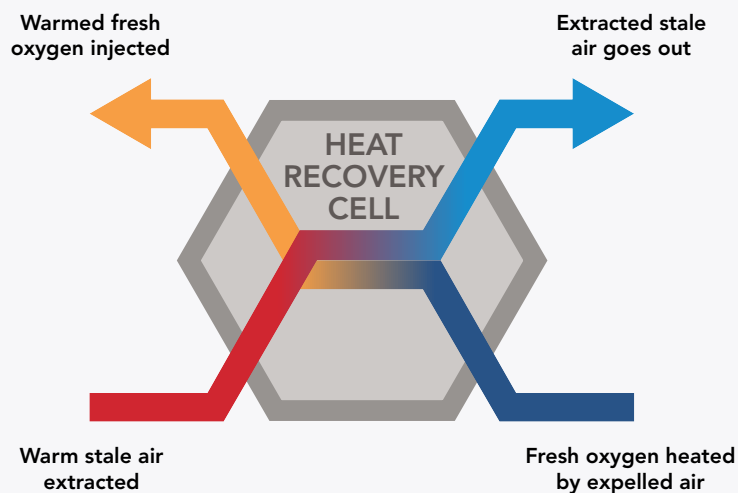
Air Tightness

Using an air and vapour control membrane (AVCL) creates an airtight layer in a Passive House to maintain continuity around the inside of the building. An AVCL is a plastic layer that restricts the movement of warm, moist air from inside a property into the fabric of the building, and prevent excess moisture entering a wall's cavity behind the insulation. The requirement for airtightness in a Passive House of uncontrolled leakage through gaps must be smaller than 0.6 air changes per hour during a pressure test of 50 pascal (both pressurised and depressurised). The AVCL reduces heat losses in the building and prevents unwanted draughts. As we know maintaining a comfortable temperature for care home and IRC residents is of paramount importance not only to their comfort but to their health.

Mechanical Ventilation with Heat Recovery

As a passive house is airtight there needs to be sufficient ventilation not only to provide fresh oxygen and expel carbon dioxide concentrations from the building, but also to remove any air borne illnesses, which as the global pandemic has highlighted, has been a major issue in care homes and IRCs. A mechanical ventilation with heat recovery (MVHR) system provides a healthy ventilation process whilst also reducing heat losses. The MVHR uses a heat exchanger to transfer the valuable heat from the extracted air back into the fresh air supply. As these units are becoming more common in the construction industry it has helped their efficiency improve and costs reduce. [In our interview with Silas Campbell of Blueleaf, he explained how interior design was focussing on sustainability at Priestly Fields in Congleton to complement the sustainability of the building which includes a heat recovery system, illustrating how this can be a holistic approach to sustainability.](#)

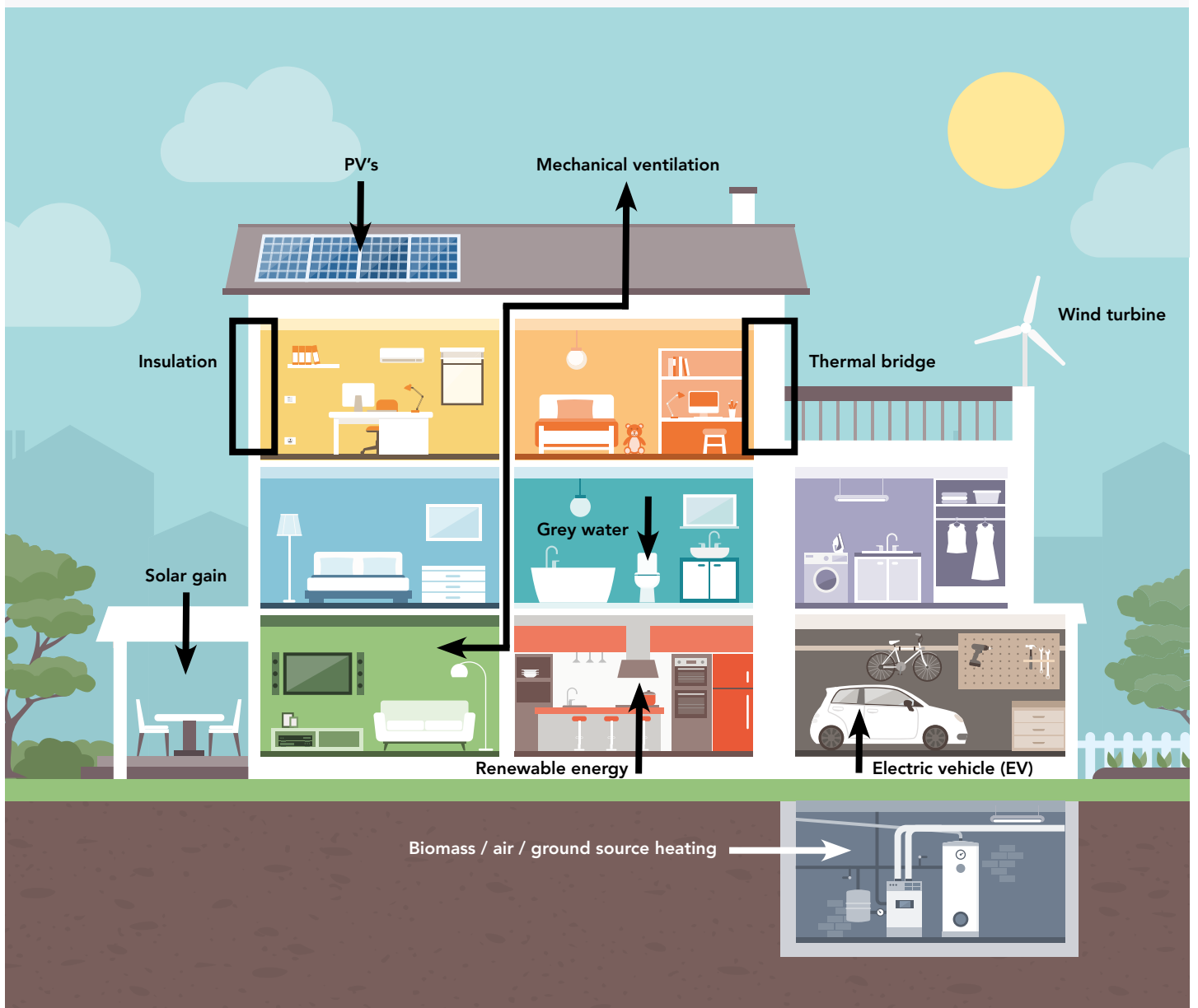
Carless + Adams has talked previously in our blog about the benefits of connecting with nature for the care home and IRC residents. Using passive house systems does not mean the windows need to be shut permanently! The joy of opening a window and the interaction with the outside world through it should not be overlooked. The purpose of the MVHR is that if the resident wants to keep the window closed then they will still feel comfortable.



source: www.nparchitects.co.uk/uncategorised/what-is-passive-house

Solar Gain

The triple glazed windows installed are the key to solar gain – when direct sunlight passes through them this passes a small amount of heat to the inside which is solar gain, while reducing any heat loss. A passive house is designed to use free heat where possible to reduce the energy needed to heat the care home or IRC. Therefore, the positioning of these windows needs to be considered to maximise the solar gain. Here in the UK having a majority of the windows located on the south of the building will ensure that the solar gain is optimum even in winter when the sun's glare is lower. There must be careful design to ensure that the summer solar gain is not too great, especially for the elderly who can be affected by heat (either too much or too little) very easily. Triple glazing can manage the solar gain during summer alongside traditional methods such as automatic shades. Within a care home or IRC the design should consider what rooms are located on the south side – it would make no sense for these to be store rooms or kitchens, but ideal for communal spaces such as dining rooms, lounges or activity rooms where a majority of the residents will be during the day.



“Sustainability for healthcare is driven by performance to ensure that residents, vulnerable people, are all catered for. There is a need to deliver for this audience without fail.”

Robert Moore, DSA Engineering



The first passive house care home for the elderly opened in 2003 in Neuwerk Caritas-Haus in Germany and is still operating today with its passive house credentials still firmly intact.²²

The care home has 80 residents who are split into 8 residential groups to form a close network and embrace a family feeling. The groups all interact with one another in communal areas. The low running costs are an attraction to residents however this is outweighed by the proven health benefits and subsequent high quality of life achieved there.

Design can integrate all of the passive house elements to the benefit of care home and IRC residents and care workers. Removing carbon dioxide concentrations, providing natural ventilation, improving internal air quality to eradicate air born illnesses and minimising external noise pollution will have a positive effect on the health of both the residents and the care workers. Passive House building principles can also be applied, and certified, for retro fit builds on care homes and IRCs. The criteria is as strict but adjusted slightly to acknowledge the constraints in place from using an existing building's structure. The guidance is in place to fit with the nation's zero carbon ambitions set out by the Government to be achieved by 2050.²³

Holistically designing care homes and IRCs with active and passive building systems integrating engineering from the outset will achieve sustainability. Reducing the energy needed through the building fabric and the use of energy efficient systems, in conjunction with onsite renewable energy generation and storage with intelligent integration with the building and the national energy network, aims to achieve a care home or IRC that is sustainably built, energy efficient and as self-sufficient as possible. Hopefully with new builds the culture within the care home or IRC will be focussed around this energy efficiency, and residents and care workers will act in conjunction with the building to focus on this energy efficiency. The scale and diversity in needs of care homes and IRCs means there is no set pattern, rule or methodology that could apply and each project needs to be considered on its own to assess and understand the desired outcomes before design even begins.

RIBA discusses how architects in particular must continually aim to improve the energy efficiency of buildings.

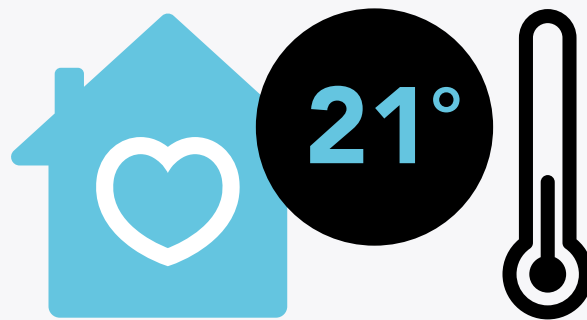


Green + Sustainable

Care homes and IRC's can be green and sustainable if the structure and processes in its development and running is environmentally responsible and resource efficient throughout the building's whole lifecycle. As we have discussed this needs consideration from planning, design, construction, through to operation and ongoing maintenance. The importance of clients, architects and engineers working together from the outset of the project to achieve these sustainable goals and to focus on the supply chain from start to finish will ensure these healthy criteria are met. Utilising these practices on offer, in addition to reducing carbon footprints and protecting resources, will give many economical and sustainable advantages.

How - in conjunction with lean and clean practices - can we design for incorporating 'green' into the care home and IRC?

Counteract High Energy Consumption



Care homes and IRCs have, and will continue to have, high demands on energy usage due to the need to keep residents comfortable in terms of warmth and the provision of sufficient water and food at peak times. Age UK recommends 21 celsius as a minimum for living areas.²⁴

To counteract this, we have discussed how the design of the care home or IRC through the lean and clean elements can achieve this. Operating 24 hours a day with specific needs for residents places huge demand on energy. Publicly disclosing energy consumption will illustrate the focus and importance that is placed on monitoring and reducing this.

Efficient Use of Energy

Demand for energy in a care home and IRC is vast. Design focusses on the correlation between floor plans and energy usage – efficient use of space can contribute to less energy needed to heat spaces. In addition, with effective floor plans the time staff spend travelling around the building is reduced too. We've discussed previously how for the health and wellbeing of residents the temperature needs to be consistent (and above average) and demand for warm water is an almost constant need. Using systems to monitor usage will identify peak times. Conducting an audit will help to understand how this energy is used and identify what improvements can be made.

Reviewing electrical appliances will also help with energy efficiencies. Energy ratings should be checked on new appliances and maintained to ensure they are operating at an optimum level. Switching appliances off completely rather than on standby will help conserve energy.

At design stage, there should be consideration made for using renewable energy but also how self-energy can be generated. The options for creating and using self generating energy are new technologies that may take some time to roll out into the mainstream for use. However, the technology is there and on different scales could be utilised.

Kinetic energy generated by the footfall at care homes and IRC's could be converted into useable energy. Piezoelectric crystals can be attached to the moving surface and the small amounts of energy captured. If there is a stream or river on property a microhydropower system could be installed. By slightly diverting the flow through a small turbine, free and constant electricity could be generated 24 hours a day!

Systems that are further down the development process and therefore with access to the equipment and skills needed to install them should be considered at design stage. Lifts within a care home or IRC are capable of generating their own power. As the lift drops by gravity, the cable it is attached to turns a turbine that generates electricity. This energy is then stored in a battery for use.

Water Conservation

The UN reports that global water demand is expected to continue increasing at 1% per year until 2050, accounting for an increase of 20 to 30% above the current level of water use. This is mainly due to rising demand in the industrial and domestic sectors.²⁵ Whilst we are fortunate in the UK to have access to clean water we need to be part of a solution rather than exacerbate the global water shortage issue.

Designing care homes and IRCs to include systems to recycle and reuse water (treated grey water can be used for toilet systems and for landscaping for example), installation of low water using appliances (low flush toilets, sensor taps, energy saving shower heads in each residents room), efficient irrigation systems for landscaped gardens, decentralised sewerage systems (this would only work when a whole new community in addition to the care home or IRC is being developed), information and communication technologies (there are many monitoring systems for real-time water quality and usage monitoring) and rainwater catchments (which once treated appropriately can be used for toilet flushing and in washing machines).

Monitoring usage will identify any anomalies, which could indicate a leak outside of the property that needs to be rectified.

Sewage Treatment

High volumes of wastewater are produced by care homes and IRCs from the care of residents and stringent cleaning by staff. Due to the contents of this wastewater it must be treated correctly (and an appropriate discharge licence provided) so incorporating this requirement at design stage is necessary to ensure that sufficient and appropriate ground space is available allowing for suitable treatment and storage whilst not detracting from the valuable landscaping.

Low Energy Lighting

Lighting is used 24 hours a day in care homes and IRCs, so low energy lighting is the most efficient option. Design will have considered the use of natural light, both for energy saving purposes but with the consideration of residents' wellbeing. Natural light and being able to see through a window releases endorphins that contribute to a resident's wellbeing and provides motivation to take care of themselves and engage in activities. We discuss this in depth in our blog "Connecting with Nature".²⁶ Using natural light will also cut the reliance on artificial light which can lend itself to a clinical feel. **However, within Britain we often have overcast days that even the best positioning of windows to enhance natural light will be unable to light sufficiently, so low energy lighting will be used.**

Light sensors should be installed in new builds to ensure that lights are only activated when the room is in use. Developing a lighting system that replicates a circadian rhythm (the human body's natural sleep clock) will also be a comfort in bedrooms at night to illuminate the way to the bathroom, and in corridors during the daytime. These can be programmed to be low level lighting rather than harsh direct light which could be difficult on the eye at these times.

Room Occupancy Controls and Sensors

Technology is developing at such an advanced rate that much is now available to make care home and IRC residents experience as it should be - like home. The technologies available when used can provide huge efficiencies, especially in terms of staff, maximising their skills where required. At the design phase, the technology requirements are considered and installation of wireless internet with accessible and clean server rooms means that smart technology can be used throughout the building. Using sustainable energy to support this necessary new technology should be a given.

Room occupancy technology will help ensure that there is sufficient seating for residents and that communal rooms are not overwhelmed with guests. Reporting this in real time to staff can help with the flow of people and ensure they are directed to suitable areas with sufficient space.

Sensor technologies available include:



Lighting: sensors can identify when the room is empty or adjust the light emitted depending on the natural light present in the room



Motion: can identify if a resident has fallen out of bed, not returned to bed after an elongated period of time or moved insufficiently during the night



Breathing: room sensors can identify changes in the pattern of someone's breathing, which can alert staff especially overnight when the person would not necessarily be observed if no health conditions prevail



Early infection detection: analysing urine content can alert staff if an infection is present



Taps: movement sensor taps to switch off when not in use



Activity levels: monitor how long a resident has been sitting so staff can encourage movement if feasible



Tracking: tracking devices can be beneficial for those with dementia but still wish to be independently active. This allows them to keep autonomy within the care home or IRC but also whilst staff ensure their safety



Health: staff can provide instant data about blood pressure and diet to GPs



Connections: family members can access real time information about their loved ones including nutritional intake and leisure activities



Auto shut downs: when equipment, such as computers or televisions, have not been active for a period of time they should have an auto shut down to conserve energy and costs

The effective use of technology within a care home or IRC provides more time for staff to focus on the residents. New technologies are developing and becoming more accessible by the day so this is by no means an exhaustive list. **Architects** work with engineers and interior designers to ensure that the building can house and allow full operation of all new technologies at conception through to allowing for adaptability in the future as they become available.

Waste Management

BREEAM criteria addresses construction waste management, use of recycled and sustainably sourced aggregates and operational waste. Upon commencement of building, a site waste management plan should be put in place to ensure that waste can be sorted into defined groups for recycling or reusing.

Design will consider the need for waste removal and access routes will be developed to ensure minimal disruption to the residents but for ease of access to the staff and waste contractors. When in operation, the care home or IRC should provide an effective waste management system to ensure that what can be recycled, IS recycled, and any clinical or hazardous waste is disposed of correctly. Sorting waste at source means that much recycling can occur when sorted into the correct bins – paper, plastic and food. This does not apply to clinical and hazardous waste which is disposed of in the correct receptacles and taken for managed disposal.

Food is one of the largest resources at a care home or IRC so referring back to the 'Lean' section of this white paper, a supplier should be selected on their credentials of low food mileage, local producers, minimal packaging, confirmation of their green/environmental accreditations and analysis of their carbon footprint before agreeing contracts.

Having visible, signed bins will ensure that residents and visitors will also encourage placing the items in the correct recycling bin. Whilst an essential item, interior designers will be consulted to ensure that their positioning does not detract from the home environment.

Waste Electronic and Electrical Equipment (WEEE) recycling ensures that anything as simple as a lightbulb is not sent to landfill. Educating staff on the availability and access to WEEE is vital.

Reduction of Pollution

Having a designed, built and functioning lean and clean care home or IRC, will result in a green facility and pollution from this will be limited. Design must consider the air quality provided for residents and staff, reduction of night-time light pollution (managed by light sensors) and reduction of noise pollution (managed through insulation).

Décor

Interior designers are consulted and the clients' aspirations and requirements considered from this early design stage. Alongside designing flexible interiors that work for the needs of the residents and staff, the materials used should be non-toxic, low volatile organic compounds, ethical, renewable and sustainable. This will help to reduce the number of harmful products that enter the air and reduce air quality. The materials used, in conjunction with the building design, will help to promote a sense of comfort and home luxury, rather than an institutional, clinical feel. Longevity and flexibility should be front of mind.

Green Infrastructure

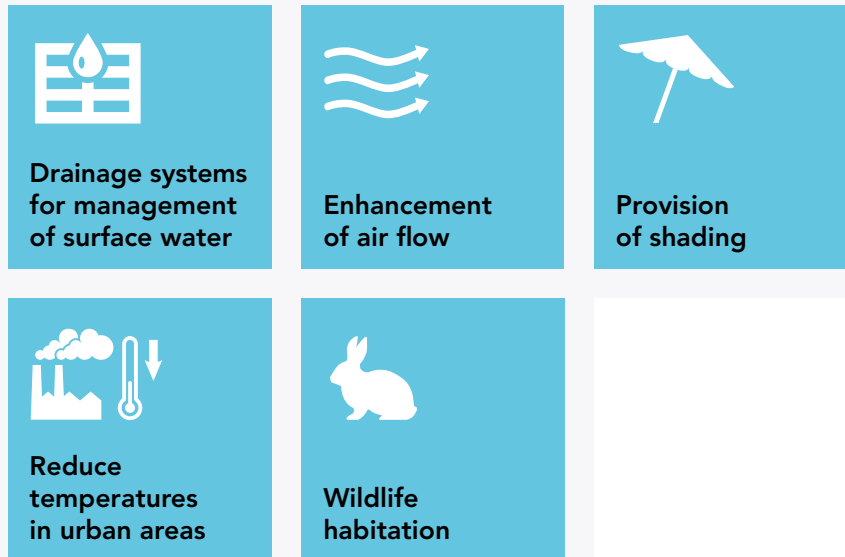
Mitigating and adapting to climate change can be affected by green infrastructure. Design considers the green infrastructure of a care home or IRC and its surroundings from concept stage and the scale of the open space should be questioned to ensure it is maximised and not just 'sufficient'.²⁷

“Biodiversity needs to be considered as well as water usage.”

Vince Ruane, Ruane CDC



Design considerations:



The use of green walls and roofs will improve the thermal performance of buildings by keeping them cooler in summer, but also provide additional insulation and warmth in winter. This also reduces the reliance on energy.²⁸

The use of plants, trees and landscaping is as valuable as the design of the building. They work holistically to enhance the residents' experience by reducing stress, anxiety and the onset of depression and other mental health problems, encouraging interaction to build a community and friendships and improving motivation. Including plants inside, both as décor or screening, can help improve air quality and provide beneficial, pleasing environments for residents and staff alike. There are vast numbers of indoor plants that filter pollutants out of the air, whilst being visually satisfying. Carless + Adams designed the first living green wall in a care home in the UK demonstrating the importance of landscaping on perception and impact on feeling for residents.²⁹

Savills believe that the social element of ESG will have greater emphasis in 2022. It could almost be stated that the care sector has always had this on their priority list for their residents, and developments such as Exeter's Green Tree Court illustrates this.³⁰

A green care home or IRC is created from the consideration of the environment at the design, construction and operation phases whilst focussing on the quality of life the residents will receive. Understanding and acting on how a design that enables adaptation to a changing environment and embracing changes to its landscape and greenery for the benefit of residents and staff will always be sustainable. Ultimately connecting residents and staff with nature is the goal.

Develop a Culture of Resource Efficiency

Designing and building lean, clean and green care homes and IRCs needs support from residents, staff and visitors to operate it efficiently. Educating staff on the technologies installed to ensure they are used to their optimum will help develop a culture around resource efficiency. Knight Frank runs a Green Ambassadors Forum internally, which encourages employees to develop their sustainability and green knowledge. On a smaller scale, something similar would be hugely effective for care home and IRC operators.

“The challenge will always be the first generation stock of care homes, however as many have stood for 200 years or so they will already be sustainable from a carbon viewpoint due to their lifespan.”

Charles Ingram Evans, Knight Frank



RetroFits

It would be remiss if we did not agree that previously discussed solutions are ideal for new builds where a blank canvas allows for so much flexibility. We must acknowledge that in the UK we have many old buildings that are still viable, both residentially and commercially, so understanding how we can improve their efficiency must be noted. [Considering that by 2050, 87% of the buildings in existence have already been built, we need to focus on improving sustainability now to meet the net zero commitment by then.](#)³¹ Retrofits will therefore be something the care industry must focus upon for improvement.



**87% of buildings that will be in existence in 2050
have already have been built**

Whilst there may be more restrictions on space and adaptability, there are likely to be opportunities to reduce an existing building's carbon footprint without reducing the residents' experience. Similarly, the embodied carbon of a 200 year old building that has been converted into a care home could be similar to that of an energy efficient new build due to the length of its lifespan so retrofits should not be considered unsalvageable despite their likely thermal inefficiency. Charles Ingram Evans of Knight Frank commented in our interview on identifying the potential sustainability of century old buildings from a carbon point of view and how best to blend new and old technologies to enhance the building for the residents' benefit.

Energy efficiency is the main enemy of such buildings – particularly moisture and poor insulation. Using a holistic approach as Carless + Adams would for a new build, assessing the buildings' situation in terms of light, wind and rain exposure can help a retro fit development become a dry efficient building through use of natural 'breathable' materials, focus on the insulation barriers, installing mechanical ventilation and omit some of these energy issues. [Silas Campbell of Blueleaf discussed older care developments and how economically sustainable these can be. Often the layout restricts what furniture or equipment can be used so it can be questioned how viable these buildings are now.](#)

[Inspired Villages' new developments are now supplied only with electricity generated through ground source heat pumps to focus on energy efficiency and be less reliant on a volatile utility market. The purpose of installing such systems now is to avoid disruption with a retrofit, which illustrates some complications that can occur when using older buildings for care. Inspired Villages' ultimate goal is to develop net-zero carbon regulated energy retirement villages which lead the way in the sector.](#)³²

The UK Passive House Organisation has created guidance and practical advice on how to develop an appropriate plan, comparing different standards available, advice on defining a recommended process to avoid unintended issues to, achieve desired outcomes.³³

Simple more straightforward switches can help, such as moving to a renewable energy provider, installing LED lighting throughout, or updating double glazing to triple. Consideration should also be given to the existing embodied carbon of the building or utilising existing foundations to see if these are feasible options to achieve BREEAM accreditation. A retro fit to focus on achieving sustainability may be complex, time consuming and potentially costly if there are access constraints, but none the less these should not be a deterrent, if the long-term benefit is evident.

Conclusion

Sustainability in the UK care sector is evolving rapidly. There are vast technologies and new building methodologies available, and alternatives and enhancements are developing at speed. The speed of this development should help drive production costs of such equipment into affordable realms as demand increases dramatically, develop and increase availability of the skill sets needed for installation and maintenance and ensure solid supply chains.

This white paper illustrates what is available and how these technologies and methodologies could be embraced. As an industry we need to work together to ensure that the technologies, methodologies and planning requirements work for the needs of the residents, care workers and operators. It would be naïve to think this is something that can be achieved in the short term – we are all still learning so much about how to fit demand with potential developments and adhere to regulations, but together we can push the industry forward in the right direction. It is not the definitive answer for sustainable development in the care sector, as everything is changing so rapidly and the future options available are so vast, but hopefully this white paper has suggested what is achievable.

Demand from those moving into care, either in care homes or IRC's, will change in their requirements as different generations become of the relevant age. Increasingly families are looking at sustainability, especially when the younger generation is involved in the decision making process. Charles Ingram Evans of Knight Frank connected this movement with planning's focus on sustainability in our interview. There will always be the fundamentals provided – care, comfort, security, companionship – but as the generations moving up into their elderly years change, so too will their needs.

Sustainable building is already a huge consideration for homeowners, with many adapting their existing homes through solar panel installation, electric car hook up points and switching to green energy suppliers, that they will come to demand this in any future house move.

Cutting carbon emissions in the construction industry is an essential step for the UK in reaching its 2050 net zero target. New residential homes, whoever their market may be, will be built to much higher environmental standards than ever before. Building sustainably leaves a positive legacy and we are therefore not creating the retrofit projects of the future. The combination of an ageing population, current lack of suitable housing supply for the elderly and the benefits to all parties that live within intergenerational housing areas can alone be the driver to push development approvals for sustainable designed homes.

Care homes and integrated retirement communities in the UK are commencing on an evolution. The social value generated from well designed, community focussed care homes and IRCs will meet the need from the growing ageing population. As those that fit in the target audience move through the decades, and the awareness of the impact of their choices on the environment is second nature, the choice of their later life living home will be influenced by the sustainable credentials of the building.

As an industry we can work together to achieve sustainable development through careful planning and for all teams to work in harmony with the end goal in sight. Establishing the scope of what net zero carbon means is fundamental both in terms of design, construction and operating. Currently the industry can focus on net zero carbon, but also needs to be mindful that as technologies and learnings develop, we can also become net zero whole life carbon neutral.

Focussing on sustainable development is a smart strategy. It can be the differentiator between care homes and IRC's, providing increased resident satisfaction and return on investment. However, that's not the only reason why sustainable care homes and IRCs should be designed. Focus on the resident. Focus on their experience and wellbeing. Make it their home.

Case study
West Downs
The University of Winchester



Construction budget	£30m
Timescale	2016 - 2020
Landscape Architect	LUC
Architect	Design Engine Architects
Client	University of Winchester
Engineers	Heyne Tillet Steel
Contractor	Geoffrey Osborne Ltd
Awards	Civic Trust Award 2022, Landscape Institute Award 2021

The award winning West Downs Campus at the University of Winchester is a recent success for the LUC team. The LUC scheme provides a range of dynamic new spaces offering various uses while providing an apt setting for Design Engine Architect's new Teaching, Learning and Social Centre.



LUC's landscape design forms the setting for the University of Winchester West Downs Campus Teaching Learning & Social Centre.

This is a landmark project for the University, and also its biggest to date. It provides much needed frontage in a prominent location within the City of Winchester and is a vital component to unlocking the University's progressive development of its estate.

Our proposals create a range of exciting new spaces that include a courtyard water garden, arrival plaza, embanked pocket green space and an upper terrace. The design utilises the level changes across the site, with a hollowed-out hillside setting, preserving a number of mature and visually significant trees, and sympathetic to the wider setting of the campus and its imposing position within the City of Winchester.

The proposals balance pedestrian activity and movements with biodiversity enhancement measures across the site. The existing natural features of the site are enhanced through additional tree planting and naturalistic landform, colonised with hedgerows and wildflower meadows. This planting buffer ensures a green edge to the site is maintained against a busy main road, whilst retaining key vistas and views through to Design Engine's new building.

Like many of LUC's schemes the health and well being of the end user is at the heart of the proposals. Since opening in 2020 the campus has become a well loved part of the University as well as a welcomed edition to the city's rich urban fabric.

Contributors



knightfrank.co.uk

Charles Ingram Evans, Knight Frank

Charles leads the Building Consultancy and Project Management team at Knight Frank and also sits on the Knight Frank Green Ambassadors Advisory board. The board helps form the firm's strategy and education programme into Environmental, Social and Governance matters by interacting with industry leading experts and applying best practices to what Knight Frank does and importantly how we do it to benefit our clients' businesses.



mccannp.com

Michael Davy, McCann & Partners

McCann and Partners specialise in providing the full range of building services associated with Mechanical, Electrical and Public Health Engineering Systems. We pride ourselves on developing innovative and bespoke design solutions for our clients. Founded in 1955, we have over 40 people in the team and our offices are based in Cardiff, Swansea, and Bristol. Sustainability is at the core of everything we do and we are able to provide a full range of MEP environmental and sustainability services for projects of any size and complexity.



harniss.co.uk

Michael Cottle, Harniss Building Services Solutions

It is paramount that the construction industry continues to challenge its processes and design solutions to understand where new innovations can be applied to current standards to ensure that the highest levels of sustainability and energy efficiency is achieved. Harniss have already seen big changes in the implementation of sustainable measures over recent years from all parties and will continue to push the industry and care sector into a sustainable future.



blueleafcare.com

Silas Campbell, Blueleaf Care

Blueleaf has been a trusted partner to social care organisations for more than 30 years. In a market where operational and commercial outcomes are inextricably linked; we focus on helping care homes achieve operational excellence by combining our knowledge and expertise with the processes and tools needed to continuously improve of a care home's operation and deliver better care outcomes. It's all about giving them the kind of care we'd want for those we love.



landuse.co.uk

Andy Pringle, Land Use Consultants

LUC is an award-winning environmental consultancy providing planning, impact assessment, landscape design, ecology and geospatial services to a wide range of public and private sector clients. With a track record spanning over 55 years and a team of more than 200 skilled professionals, we are united by a determination to achieve sustainable development on behalf of our clients. With the current climate emergency in mind, we ensure that all our work promotes climate change mitigation and resilience. We care about the legacy we leave and hope to make a real difference through the work we do.



ruane-cdc.com

Vince Ruane, Ruane CDC

RCDC was set up 2.5 years ago due to frustrations at the speed of change in the industry, and appetite to produce truly sustainable designs. We want the work that we do to have a positive lasting impact, and generate the performance data and business cases to support the switch to highly sustainable, fully electric buildings. We are highly aware that we cannot reduce the emissions of our buildings alone, which is why collaboration is a key aspect of our approach, alongside our three driving principles: Sustainable, Digital, Innovative. Our design work tends to involve going beyond building regulations and planning requirements in order to give clients the data and information they require to make informed decisions.



dsaengineers.com

Robert Moore, DSA

DSA Engineering actively seek challenges so that we can strive to achieve those elegant solutions that others in hindsight say, "why didn't we think of that?" The engineers of dsa ENGINEERING have a passion for work that spurs them on to the challenges of environmentally sound designs that are economical to install and maintain.

“You don’t stop laughing when you grow old.
You grow old when you stop laughing.”

George Bernard Shaw



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Carless + Adams' work is independent, and the views expressed in this publication are those of Carless + Adams and the contributors.



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