The Road to Net Zero:
Prologis UK and Planet Mark - 15-years of Low Carbon Development

PROLOGIS® PlanetMark

Executive Summary

Over the past 15 years Prologis UK, in partnership with Planet Mark, has put sustainability firmly at the forefront of their developments; embedding it into the design process, operations, community impact and supply chain. The output of this process is easily quantifiable; cumulative whole-life carbon reduced, embodied carbon mitigated, and acreage of rainforest protected have all been tracked. It is less easy to track some of the less tangible, yet far-reaching impacts associated with a programme of this scale. This report reviews some of the highlights and successes that define this journey.

The process Prologis helped create, is closely aligned with the current definition of net zero in construction as used by the UK Green Building Council (UKGBC) and others. Definitions and standards, however, both within and beyond the construction sector are rapidly evolving to help ensure consistency and credibility. Industry alignment around net zero is exciting and imperative, as it drives down whole-life carbon emissions and embeds a culture of continuous improvement and innovation.

Further to this, all Prologis developments support community engagement and local sustainability projects, including funding for schools and colleges to achieve Planet Mark certification and to engage and support students in cutting carbon emissions. The programme also includes curriculum-based workshops run by the Eden Project on sustainability and the importance of nature in our lives.

In summary, across 74 projects, covering more than 19 million ft^2 of development, Prologis has achieved outstanding results:

Carbon Reduction

25% average
whole-life carbon reduction
per development

476,819 tCO_2e
total lifetime
carbon reduced

Carbon Mitigation

879,158 tCO_2e
total carbon mitigated

4.8 million tCO_2e stored
through rainforest protection

4.1 million
trees protected

17,683 acres of
rainforest protected

Social Impact

68 schools and
colleges achieving
Planet Mark certification

597 kgCO2e average carbon
measured per pupil or staff
member across all education sites

13,016 students
engaged in
sustainability sessions

The programme demonstrates how taking responsibility for your carbon emissions can deliver far-reaching impacts. This is the essence of Net Zero in Construction; bringing organisations together to deliver on a mutual goal, to radically reduce carbon and mitigate the remainder.

This paper explores how Prologis were forerunners in developing current understanding of Net Zero in Construction, and how, together with Planet Mark, the programme continues to evolve and drive change.

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Prologis Park Pineham

Introduction

In 2007, Prologis developed the Pineham distribution centre in Northampton for UK grocer, Sainsbury's. From the outset, the project committed to measure and reduce whole-life carbon emissions, with a particular focus on reducing embodied carbon. After reduction, the unavoidable remaining embodied carbon was offset using accredited projects, specifically selected to deliver additional social impact.

Carbon reductions were achieved by engaging directly with the design team, the main contractor, and the supply chain. It established a process that was to become a precursor of what we now recognise as Net Zero in Construction. In total, 74 Prologis projects have followed this same process over a 15-year period of continuous carbon reduction and mitigation.

Martin Cooper, Vice President, Project Management.

The Programme – A partnership between Prologis and Planet Mark

The programme was designed to bring focus to the measurement and reduction of the whole-life carbon emissions associated with new buildings, shine a light on the embodied carbon, and take responsibility for its reduction and mitigation. The Planet Mark team developed the programme further, to create a 3-step process of Measurement, Engagement and Communication to ensure consistent delivery across all projects.

1 Measurement

Whole-life carbon emissions are measured in relation to a notional baseline using a lifecycle assessment (LCA), following recognised standards (BS EN 15978:2011) and methodologies (Royal Institute of Chartered Surveyors Whole Life Carbon Method, 2017). Planet Mark requires a minimum 2.5% reduction of embodied and operational carbon emissions of the as-built project, compared to the notional baseline.

Recognising the importance of reducing embodied carbon across all developments, it is important to acknowledge that you cannot completely remove all embodied carbon. Accordingly, Prologis have mitigated more than 100% of the unavoidable embodied carbon across all projects, effectively making them net zero. The whole process is reviewed and verified by Planet Mark as part of the Development Certification.

2 Engagement

Stakeholders across all projects are engaged to raise awareness of sustainability and how to reduce carbon emissions. This includes engagement sessions with the supply chain and local community.

- Supply Chain – launch meetings and a sustainability workshop are conducted on each project to identify sustainability initiatives and opportunities to drive down carbon emissions.
- Local Community - sustainability projects are funded by Prologis to support carbon reduction and educational activities in schools and colleges local to each development.

3 Communication

Communication is an essential component of sustainability, to help increase action and raise awareness. It is an important element of the Planet Mark certification process as it ensures a high level of integrity, trust, and transparency.

Communication materials are distributed to each site, including posters and banners, to encourage everyone to support the associated sustainability goals. Each project receives a detailed certification report, and certificates of achievement are presented to the project teams.

Aligning with Net Zero Carbon Buildings

In 2019, the UKGBC announced that they had developed a framework definition for net zero carbon buildings, to provide clarity to the industry on how to achieve net zero carbon in construction and operation. This framework definition was achieved by bringing together a variety of industry stakeholders to form a taskforce aimed at defining a consensus approach. From this taskforce the following definition for Net Zero in Construction was defined:

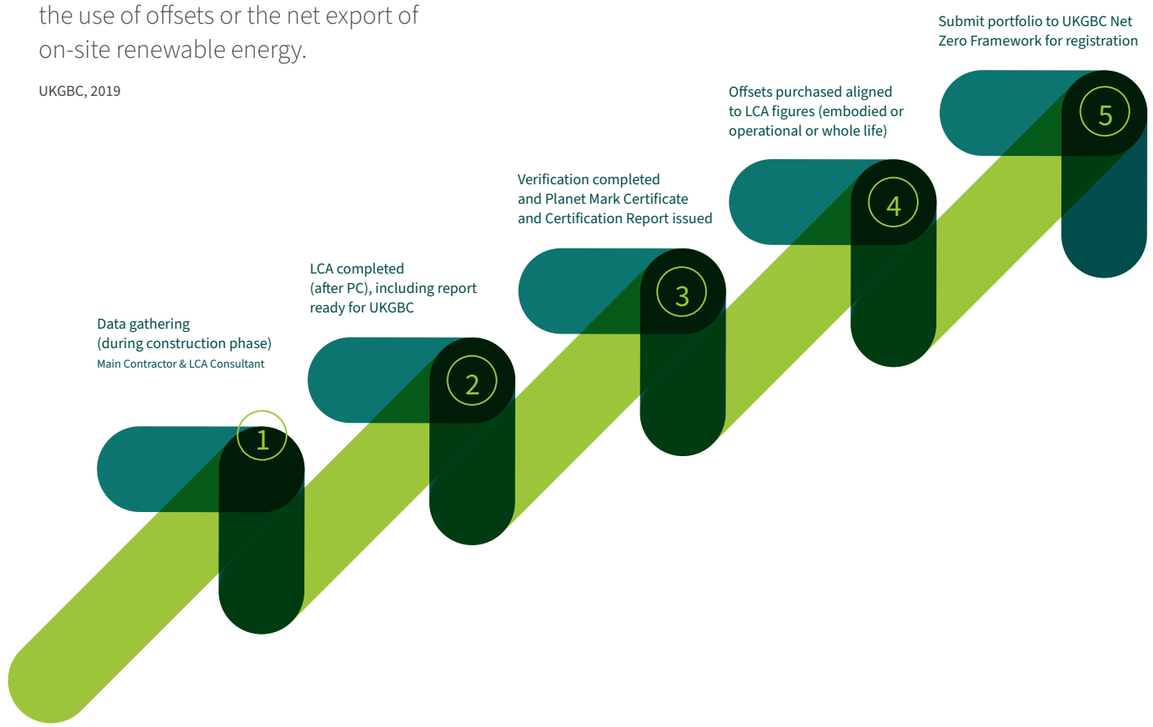
> When the amount of carbon emissions associated with a building's product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy.
>
> UKGBC, 2019

A report published towards the end of 2021 added to this, indicating that "the measurement and mitigation of embodied carbon at project level is typically voluntary, with no existing regulatory or statutory mechanisms in place to drive demand side efficiency. Many leading developers and infrastructure clients now measure and optimise the embodied carbon footprint of new projects, and technical standards and guidance are available to do this, but it is far from being mainstream practice across the industry."

Net Zero Whole Life Carbon Roadmap, UKGBC, 2021

The principles of the Prologis and Planet Mark devised programme, align with the definition of net zero adopted by the UKGBC. The programme follows the same recommended process to reduce whole-life carbon emissions, especially embodied carbon, and offset only residual unavoidable emissions as a 'last resort', as indicated in **(figure 1).**

Figure 1 - Steps to aligning your New Development with UKGBC Net Zero framework



Whole-life Carbon Reduction in Prologis Projects

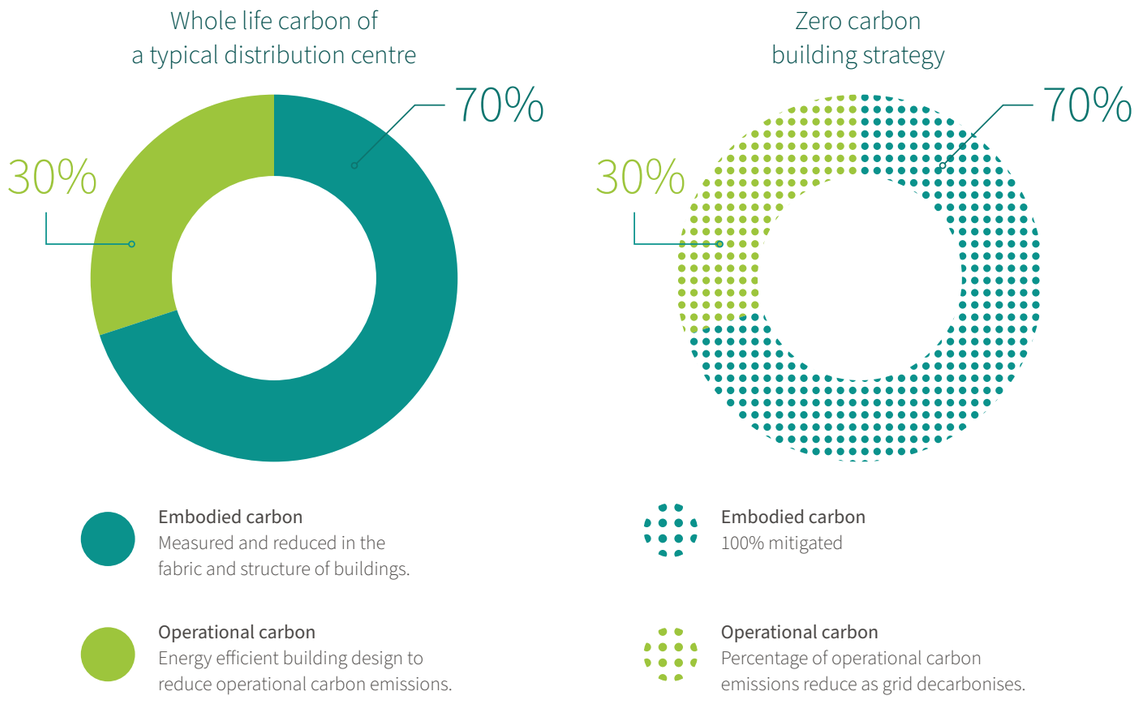
Typical projects include distribution centres and logistics hubs in Prologis Parks, provided for customers from grocers such as Sainsbury's and Tesco, distribution businesses such as Royal Mail and Eddie Stobart to car manufacturers including BMW and Jaguar Land Rover. Other projects have included constructing data centres and manufacturing facilities in various locations across the UK.

Although the simple portal frames structures do not represent complex construction projects, the drive for continuous improvement in sustainability and carbon reduction has been relentless. As a result, a knowledge database has been built and best practices adopted for others to follow. This includes embedding sustainability into the design and specification of developments and the continual search to support sustainability initiatives on every project.

Carbon reduction in the built environment has typically focused on operational emissions i.e., those emissions associated with the energy consumption of buildings in operation. This disregards the embodied carbon associated with the raw materials, manufacturing processes, transport and construction of projects, as well as ongoing maintenance and end-of-life of the building.

Measurement of whole-life carbon in Prologis developments, however, soon revealed that up to 70% of the lifetime emissions of a distribution centre could be those associated with its embodied carbon. The largest proportion of this embodied carbon was emitted in construction i.e., the first few months of a property's life. The remaining 30% attributed to operational emissions is set to reduce over time as the UK grid decarbonises. This realisation prompted Prologis to measure, reduce and mitigate a minimum of 100% of the embodied carbon across its new developments with a strategy to cut carbon at scale **(figure 2)**.

Figure 2 - *The whole life carbon of a typical distribution centre compared to a zero-carbon building strategy.*



Lifecycle Assessment

As a developer, Prologis recognised its responsibility to positively impact both embodied and operational carbon, to account for the whole-life carbon of each property developed. Accordingly, Prologis could take responsibility for the immediate and direct impacts of the construction phase, whilst also designing-in low carbon solutions to help its customers reduce operational emissions.

The adage 'you can only manage what you measure' is particularly true for carbon. Prologis committed to conduct a Lifecycle Assessment (LCA) on all projects to quantify and reduce all carbon emissions on an ongoing basis. The LCA is delivered by the Sustainable Business Partnership (SBP), who are experts in carbon measurement for logistics centres and long-term partners with Prologis. It considers all carbon emissions over the lifetime of a building, from the raw materials used in construction to de-construction, end-of-life and re-use of materials *(figure 3)*.

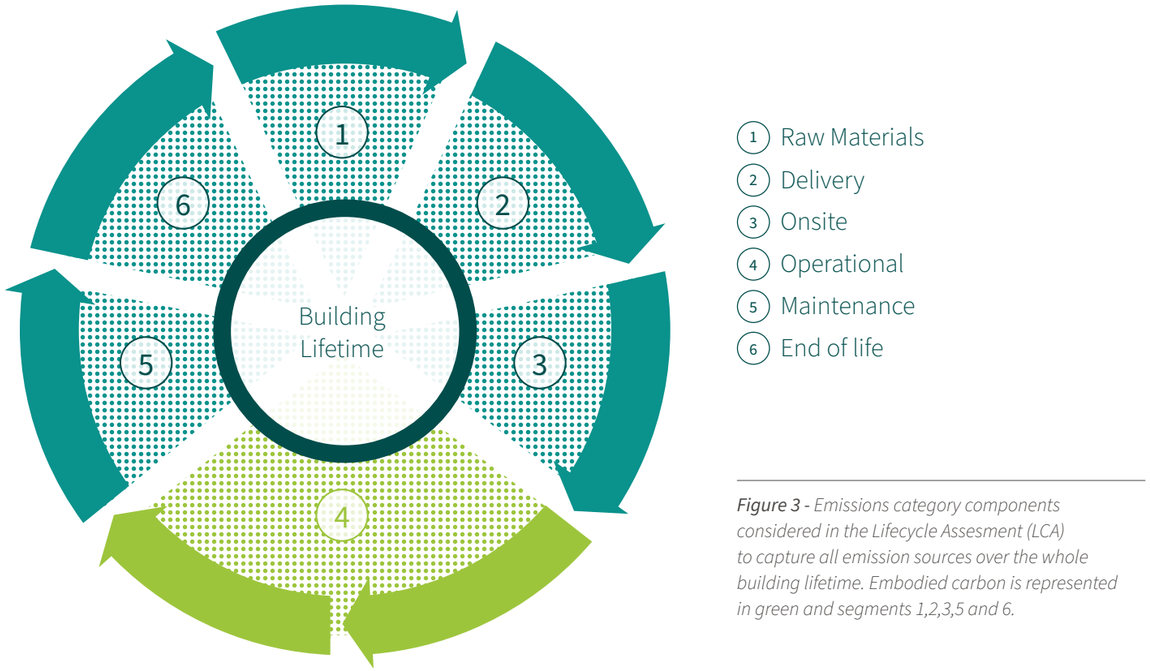


Figure 3 - *Emissions category components considered in the Lifecycle Assesment (LCA) to capture all emission sources over the whole building lifetime. Embodied carbon is represented in green and segments 1,2,3,5 and 6.*

The LCA uses data gathered from Environmental Product Declarations (EPDs), the Bill of Quantities and other sources and models the future maintenance and end-of-life emissions. Operational carbon emissions are modelled and estimated using the as-built Building Regulations UK Part L (BRUKL) report for regulated energy. The LCA is conducted up to Practical Completion to enable like-for-like comparisons as Prologis hand responsibility to their customers to choose their own fit out.

Carbon Reduction at Scale

The LCA calculates the carbon emissions for each development and makes a comparison against a notional baseline defined as; a ‘typical’ distribution centre using industry standard specifications. To reduce both embodied and operational emissions, a wide range of sustainability initiatives are considered in the project plan.

Proposed initiatives target reductions in both the embodied carbon, with increased use of recycled materials, cement replacement and site profiling, as well as the operational carbon by installing renewable energy sources, high bay LED lights, insulation, and roof light panels.

At the commencement of each new development, relevant sustainability initiatives are identified using the Prologis specification and project supplier workshops, and the associated carbon savings are then calculated. This process drives innovation, creates a legacy of better building practice, and determines specifications for the whole construction industry.

476,819 tCO_2e total lifetime carbon reduced
117,115 tCO_2e total embodied carbon reduced
359,704 tCO_2e total operational carbon reduced
25% average whole-life carbon reduction per development

Carbon Mitigation

All unavoidable embodied carbon emissions in Prologis developments are mitigated by protecting areas of rainforest in a long-term partnership with Cool Earth, a climate change charity working with indigenous peoples and local communities. Cool Earth exists to provide financial support directly to rainforest communities, helping to fund projects that create choice, tackle the root causes of deforestation, and protect vital carbon sinks.

It is an acknowledgement that local communities are the real rainforest experts, and importantly, they are the people who are faced with extreme injustice whilst living on the front line of the climate crisis. By supporting Cool Earth, Prologis is not just mitigating its unavoidable embodied carbon, but their developments are backing the real climate experts, indigenous people, and rainforest communities.

Cool Earth exists to champion the relationship between people, rainforests, and climate. They raise and give cash directly to, and partner with, indigenous people and local communities on projects that tackle the root causes of deforestation. Indigenous people and local communities have always protected the rainforest, nurtured it, and kept it healthy for thousands of years. Tropical rainforests are vital carbon sinks that regulate our global climate and are irreplaceable ecosystems. These carbon-capturing tropical biomes account for the highest area of forest globally. Keeping rainforests intact can provide 23% of climate mitigation urgently needed to cool our planet. Backing the people that live there, recognising and respecting their rights is essential in fighting the climate crisis.

COOL EARTH

Carbon mitigation calculations and review

Cumulative estimates of mitigated carbon per acre and the number of individual trees protected helps to objectively measure the success of the programme. The calculation for estimating the number of trees is supported by data derived from the Crowther Laboratory, an interdisciplinary team of ecosystem scientists. To determine an estimate of mitigated carbon, it is first necessary to identify the carbon storage capacity of standing mature forests, which has been calculated by Office National des Forêts International (ONFI).

This uses a measure of carbon density derived from a map of above-ground biomass, which is then converted to vegetative carbon using Intergovernmental Panel on Climate Change (IPCC) recommended values. Carbon in standing forests can then be calculated by multiplying the carbon density by the forest area. Cool Earth continually review and update their calculations using localised data sets and in 2021 added data from the Global Ecosystem Dynamics Investigation Lidar (GEDI) project for greater accuracy in measuring forest biomass.


The Amazon

Locations

The Amazon

Cool Earth has been working with the Asháninka in the Peruvian Amazon for over 10 years. With thousands of years of history, culture, and traditional knowledge, the Asháninka are custodians of over 145,000 acres of rainforest. Cool Earth partners with four villages in Peru’s Ene Valley, working to create long-term choice beyond deforestation through a series of community-led projects. From cash giving to cacao farming and wildfire prevention, people-powered projects enable social and economic growth that helps communities tackle threats to their forest.

New Guinea

Stretching 73 million hectares, the New Guinea rainforest is the third largest rainforest on Earth. This incredibly biodiverse, resource-rich and extremely valuable ecosystem is home to 7% of all global species. Cool Earth has been working with communities in the Milne Bay Province area since 2015, helping with projects to support climate adaption and cash-driven initiatives that benefit people and fight the climate crisis. Whether it’s education, improving water and sanitation infrastructure, or developing careers in conservation, community-led projects aim to instil the confidence needed to make decisions that affect local people’s future and the future of the rainforest.

17,683 acres of rainforest protected

4.1 million trees protected

9,218 acres protected in Peruvian Amazon

8,465 acres protected in New Guinea rainforest


New Guinea

Supply Chain Sustainability

All new Prologis construction projects follow clear sustainable specifications, ensuring that embodied and operational carbon is reduced at every opportunity. At the launch of each development, time is scheduled for a supplier meeting to make sure that everyone in the supply chain understands the principals of sustainability and its relevance to both design and delivery. Spending this time on education facilitates collaboration, improves data quality and increases the transparency and integrity of the development's whole life carbon footprint. This helps identify areas for further emissions reduction and stimulates innovation.

With this approach, Prologis is helping to create a legacy of sustainability best practice and embed it within the construction and logistics sectors. Accordingly, many stakeholders in the supply chain have themselves become holders of the Planet Mark Business Certification, to target year on year reductions in their own operational carbon footprints.

Across the Prologis supply chain, Planet Mark certified stakeholders have achieved:

14.4%
average absolute tCO_2e carbon reduction per year since 2013

18.5%
average tCO_2e carbon reduction per employee since 2013

428,733 tCO_2e
total collective carbon reported since 2013

Community Engagement

As part of the community engagement programme included alongside each development, local schools or colleges are offered a workshop from the Eden Project and a Planet Mark certification to help them calculate their carbon footprint and target reduction activities.

Contribution to Warwickshire College Group (WCG) Sustainability Programme since 2013

63 individual primary schools engaged

13,016 students engaged in sustainability sessions

597 kgCO2e average carbon measured per pupil or staff member across all school and college sites

68 schools and colleges achieving Planet Mark certification

Eden Project workshops

The Eden Project is an educational charity, connecting people with each other and the living world to explore how collectively we can all work towards a better future. Drawing on their experience of working with hundreds of thousands of young people and their teachers, the Eden Project team partnered with Planet Mark to create three different workshops, targeted at different primary school age groups. Eden works with each school for a day delivering up to three sessions, with the school choosing which workshops to deliver and which classes will attend.

The Climate Response, Sussing Sustainability and Rainforest Connections workshops introduce students to conversations surrounding ecology, biodiversity, basic sustainability principles and climate change in fun interactive ways. Students are presented with achievement certificates to reward and document their workshop participation. The intention of these sessions is to help inspire and empower children to continue their climate change journeys and understand the importance, and fragility, of the natural world.

Planet Mark certification

By helping schools achieve Planet Mark Business Certification for Schools, Prologis have been supporting a recognised commitment to continuous improvement, to measure and reduce carbon emissions, energy use, water consumption, travel, and waste. This direct investment into local communities embeds a legacy of sustainability and helps these schools make financial savings.

As part of the certification process, the school receives an annual carbon footprint and detailed report to track their progress. Toolkits are provided to help support continuous improvement and communications materials are shared to help schools talk about their sustainability ambitions and progress.

Warwickshire College Group (WCG) Sustainability Programme

Prologis has worked with the Warwickshire College Group for almost 10 years to support the college clusters' sustainability journey. This support has included providing Planet Mark engagement workshops to staff and students to embed sustainability into college culture and continued Planet Mark Business Certification helping the group reduce carbon across all their sites and operations. Through the Eden Project, workshops have been created to help educate students on sustainable design and construction and the importance of collaboration in solving global sustainability issues.

IMPACT Day, May 2022. The UK Prologis team joined forces with Whiting Landscapes to create a community park for One Village in Northamptonshire. (IMPACT Day is Prologis's annual day of giving back and is in it's tenth year).

Conclusions

This report summarises the success of the Prologis and Planet Mark derived programme for embedding sustainability into the construction of new buildings. The programme demonstrates how taking responsibility for your carbon emissions can deliver far-reaching impacts. Accordingly, over 15 years and across 74 projects, Prologis has made an average 25% whole-life carbon reduction per development and mitigated a total of 879,158 tCO_2e.

The programme follows a robust methodology for accurate measurement of the whole-life carbon emissions associated with new buildings. It recognises that a significant proportion of the lifetime emissions relate to embodied carbon, shown to be up to 70% of the lifetime emissions of a typical distribution centre. Moreover, the largest proportion of this embodied carbon has been found to be emitted during construction. This knowledge formed the cornerstone of the Prologis and Planet Mark approach to measure, reduce and mitigate embodied carbon across all new developments. In pioneering this approach, Prologis established a process that closely aligns with the net zero buildings definition as used by the UK Green Building Council (UKGBC) and others.

Prologis chooses to mitigate unavoidable embodied carbon through large-scale rainforest protection projects, which avoid deforestation, lock-in carbon within forest ecosystems and deliver direct rainforest community benefits. The human impact of these projects in helping to improve livelihoods and empower communities is difficult to quantify, but by directly protecting 17,683 acres of vital rainforest, the programme is helping to form a community shield for a further five-million acres.

Closer to home, tangible local community benefits are built into all Prologis new developments to support community engagement and local sustainability projects. To date this has included funding for 63 schools and colleges to achieve Planet Mark certification and the engagement of over 13,000 students. This investment in the community creates a legacy of sustainability, supports commitment to continuous improvement and will ultimately continue to drive sustainable innovation in the future.

Over 15 years and across 74 projects, 25% whole-life carbon reduction per development, mitigating a total of 879,158 tCO_2e