The Scottish National Investment Bank

Tackling the Grand Challenges Series

Understanding the carbon burden: Investing for Scotland’s net zero future

by Craig Love, Aoife Hutton and Dr Mary Dodd

The pathway to net zero presents complex challenges. The reality is that not all the investments we make will directly reduce carbon emissions. Instead, many will play a crucial enabling role in the broader transition to net zero.

This introduces the concept of a **carbon burden**, defined as the greenhouse gas emissions emitted as a result of supporting the journey to net zero. This concept underscores a key paradox: some actions essential to achieving net zero may initially result in high emissions, highlighting the complexity of supporting the transition pathway.

Introduction

The transition to a net zero economy comes with its challenges.

Although the financial costs of a net zero transition are becoming better understood, the carbon burden – the emissions associated with enabling the transition – remains underexplored.

In this paper we examine this challenge and offer transparency around our own decision-making at the Bank as we support Scotland's transition to net zero. We focus on three areas:

- Providing context on Scotland's net zero transition and defining the carbon burden
- Exploring how the carbon burden manifests in the Bank's portfolio
- Outlining how the Bank engages with portfolio companies to support their transition journeys

Tackling the grand challenge

Climate change is accelerating faster than previously predicted, driven by the continued rise in greenhouse gas emissions. Its consequences – more frequent and intense weather events, shifting climate patterns, and rising sea levels – pose a serious threat to communities across the globe.

Scotland is firmly committed to combating climate change, through achieving net zero emissions by 2045. This ambitious transition will require systemic transformation across key sectors, including energy, transport, and industry.

Scotland is firmly committed to combating climate change, through achieving net zero emissions by 2045.

The Bank's role

Addressing the grand challenge of the climate emergency and supporting Scotland's transition is at the heart of the Bank's purpose. Indeed, one of our three core missions is to ***"address the climate crisis through growing a fair and sustainable economy"*** (referred to as our Net Zero mission).

As a development bank, we prioritise long-term commercial returns with attendant socio-economic benefit over short-term profit, focusing on projects that promote inclusive growth, infrastructure, and sustainability.

When evaluating a potential investment's alignment with our Net Zero mission, in addition to assessing risk-based commercial returns, we apply mission objectives to identify opportunities that offer the greatest potential to deliver our overarching theory of change.

Our origination strategy has been developed using insights gained from our portfolio, strategic relationships, and deep understanding of the policy and investment landscape. This process helps us identify emerging investment themes and priority sectors.

Our Net Zero mission	**Mission objectives** Mission objectives set out the strategic impact we want to deliver through our investment activity.	**Mission impact** Mission impact is the longer-term change at a national level that our investment contributes towards.
Net Zero	◆ Catalyse investment in businesses and projects connected to Scotland, in the move towards a net zero economy. ◆ Increase Scottish-based expertise in technology, services and industries that support decarbonisation, mitigation, and climate change improvement activity. ◆ Grow the circular economy within Scotland. ◆ Support Scotland's overall transition to net zero.	◆ **Just Transition to net zero by 2045.** ◆ **Scotland's economy contributes to and is aligned to Global GHG emission reduction targets and goals by 2045.** ◆ **Scotland is internationally recognised as a leader in sustainable technology, services and industry.** ◆ **Scotland has increased base of high-skilled individuals within engineering and data technology roles supporting sustainable economic growth.**

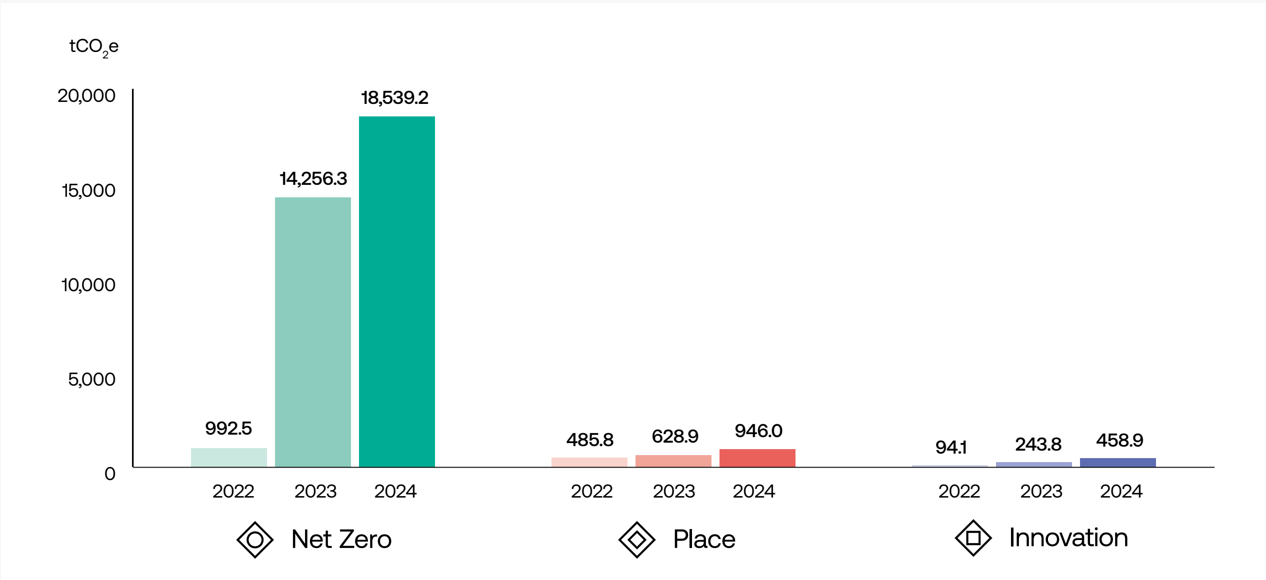
The carbon burden

Scotland's oil and gas sector has been a cornerstone of its economy, supporting thousands of jobs, as well as bringing skills, infrastructure and economic prosperity to many regions – particularly the North East. While the need for a transition to a more sustainable future is well-understood, the transition must be done with due care and consideration; in other words, it must be a Just Transition.

Tackling Scotland's most pressing decarbonisation challenges requires more than ambition, it demands new infrastructure, resilient supply chains, and cutting-edge technologies to enable an effective transition. Our net zero investments are selected with this broader goal in mind: to enable Scotland's shift to a low-carbon economy.

As we build a portfolio of high-growth companies, many will see emissions rise as they scale up. This trend is already evident in our aggregate portfolio emissions and is expected to continue as our portfolio companies grow and as we make further investments into new businesses and projects.

tCO_2e of Scope 1 and Scope 2 emissions by mission



While some investments deliver measurable carbon reductions over time, others will never directly reduce, save or capture emissions. Yet they are critical enablers of the broader net zero journey, providing essential services to sectors that help reduce emissions.

This is where the concept of a 'carbon burden' becomes important. We define this as ***"greenhouse gases emitted as a result of supporting the journey to net zero to provide broader, long-term societal and environmental benefits"***. In other words, it refers to the emissions generated by activities, investments, or processes that enable long-term decarbonisation.

This highlights a necessary paradox: some of the very actions that support net zero will generate high emissions in the short term.

The carbon burden continued

Guidance published by the Institute of Environmental Management and Assessment in 2022 speaks to this paradox, stating that: ***"the crux of significance is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions [...] towards net zero."***

As a development bank, embracing this paradox and being transparent in the role we play is essential. We recognise that delivering real, sustained impact takes time – and that some interventions essential to the net zero transition will carry a short-term carbon burden. These emissions reflect the foundational work required to unlock deeper, systemic decarbonisation over time.

This transition is not only unfolding within Scotland but is also a topic of discussion among financial institutions globally. The EU Green Taxonomy, an emerging classification system that helps investors to make sustainable investment decisions, recognises three tiers of sustainable economic activity – primary, enabling, and transitional. In short, these can be understood as:

The three tiers of sustainable economic activity

Primary activities

These activities directly contribute substantially to environmental objectives (e.g. generating renewable energy)

Enabling activities

Activities which facilitate the primary activities (such as the immediate supply chain for wind turbines)

Transitional activities

Activities with limited low-carbon alternatives (e.g. steel, cement, aluminium), which adhere to best available environmental practices.

All three are essential. Despite their carbon burden, enabling and transitional activities are critical to scaling primary solutions – and part of the pathway to net zero.

Our portfolio

Our portfolio contains a variety of what could be considered primary, enabling, and transitional activities:

Primary activities

Renewable energy generation projects provide a good example of 'primary' activities, of which Scotland has a strong pipeline (particularly in offshore wind), bringing with it significant economic opportunity.

Due to the emissions associated with the materials, manufacturing and construction of these assets, a new facility typically needs to run for several years before it begins to deliver overall carbon savings. This can be referred to as a 'carbon payback period'.

These types of investment are an important part of our investment pipeline and growing portfolio, delivering broader emissions reductions over time, which is one of the reasons they can benefit from patient capital such as that available from the Bank. There is often a direct relationship between commercial returns and carbon savings over time, as both are typically realised only once a project is operational.

Enabling activities

While renewable energy generation provides a good example of an investment which will directly result in emissions reductions, there are other investments which will increase the carbon burden in the short term. Indeed, many of our investments will never achieve direct emissions reduction, savings, or capture; however, they remain critical enablers of the transition.

Without the required critical infrastructure, there will be no transition to clean power generation. To operationalise the offshore wind opportunity in Scotland, for example, the establishment of large-scale port and component manufacturing facilities will be required; some of which has a high carbon burden attached.

Once operational, these investments will significantly increase Scotland's offshore wind potential, as well as providing local opportunities, supporting and creating hundreds of jobs.

Several companies in our portfolio directly feed into supply chain requirements for clean energy generation; these include cabling, servicing, and anchoring. These will all carry emissions burdens, from fuel use to embodied carbon. Our role is to assess whether these investments meaningfully contribute to Scotland's transition pathway. We apply a Theory of Change[†] approach to evaluate impact throughout the investment process, also accounting for other factors.

[†]A Theory of Change is a structured explanation of how and why specific inputs or activities are expected to lead to desired short-term, intermediate and long-term changes (outputs, outcomes, and ultimate impact). This approach is recognised as a valuable tool for helping investors move from broad intentions to clear, evidence-based practices and accountability throughout the investment lifecycle. (Adapted from Operating Principles for Impact Management, 2025.)

Our portfolio continued

Transitional activities

The EU Green Taxonomy acknowledges the necessity of some activities "which cannot yet be replaced by technologically and economically feasible low-carbon alternatives."

Certain activities carry a high carbon footprint yet remain essential to society. Projects such as construction require materials (cement, steel, etc.) and utilise existing plant/machinery which tend to be carbon-intensive. These industries are considered transitional in nature, as they seek to adopt lower carbon alternatives as they emerge. However, they still have associated carbon emissions, and we must actively pursue innovation and advancement in these areas.

In our investments, we encourage the adoption of 'best practice' to minimise environmental harm by requiring investees to develop a carbon management plan – while also ensuring positive social outcomes. For construction projects, some companies choose to align with environmental standards (such as PAS2080 or BREEAM).

Investment in transitional sectors is inherently dynamic, shaped by evolving market conditions and regulatory frameworks that drive environmental improvements. For instance, new housing developments in Scotland (schemes which received building warrant after 1 April 2024) must now comply with the New Build Heat Standard, which prohibits the installation of fossil fuel-based heating systems. This has led to growing demand for lower-carbon solutions such as air and ground-source heat pumps, and electric heating systems, contributing meaningfully to climate change mitigation by avoiding long-term reliance on fossil fuels.

Supporting a full economy transition

Ultimately, if we wish to achieve Scotland's climate objectives, all parts of the economy must transition to a decarbonised, climate-resilient future. While we acknowledge there's an unavoidable carbon burden, we are committed to supporting a just transition – one that includes the whole economy. Each company in our portfolio is on a unique journey. By working with them to understand and manage their emissions, we help drive tangible environmental improvements.

In 2023, the Bank committed to ensuring that all new investments deliver a carbon management plan or net zero strategy. For existing investees without one, we offer support to develop it. Today, over 95% of our portfolio has either implemented or is developing a plan. Many also meet industry best practices such as PAS2080, BREEAM, and ISO14001. Our team regularly engages with portfolio companies to support and stretch ambitions. Through this engagement, we ensure alignment with Scotland's national net zero target.

Shifting the carbon burden out of our portfolio would not equate to supporting system-wide decarbonisation. Our focus extends beyond our own portfolio emissions – we are committed to, and our mandate directs us to, support Scotland's overall emissions reduction, and for these reasons, we actively invest in enabling and transitional activities.

Scotland's domestic emissions fell by 1.9% in 2023, with progress in decarbonising electricity generation. Yet hard-to-abate sectors like transport and heat in buildings continue to lag. Sequencing, trade-offs and short-term carbon burdens all represent important considerations in the pathway to net zero.

As an impact investor, we recognise the complexity and urgency of this transition. It will involve unavoidable carbon burdens and demand a dynamic, adaptive approach. We are committed to continuous improvement, which is reflected in our evolving Investment Strategy and two-way engagement with portfolio companies. As we learn and adapt, we welcome collaboration across sectors to co-create a resilient, inclusive, and net zero Scotland.

The
Scottish
National
Investment
Bank

Scottish National
Investment Bank plc
Waverley Gate,
2-4 Waterloo Place,
Edinburgh,
United Kingdom
EH1 3EG

www.thebank.scot
enquiries@thebank.scot

Scottish National Investment Bank plc is wholly owned by Scottish Ministers
Registered in Scotland with Company number SC677431

SNIB119.0925