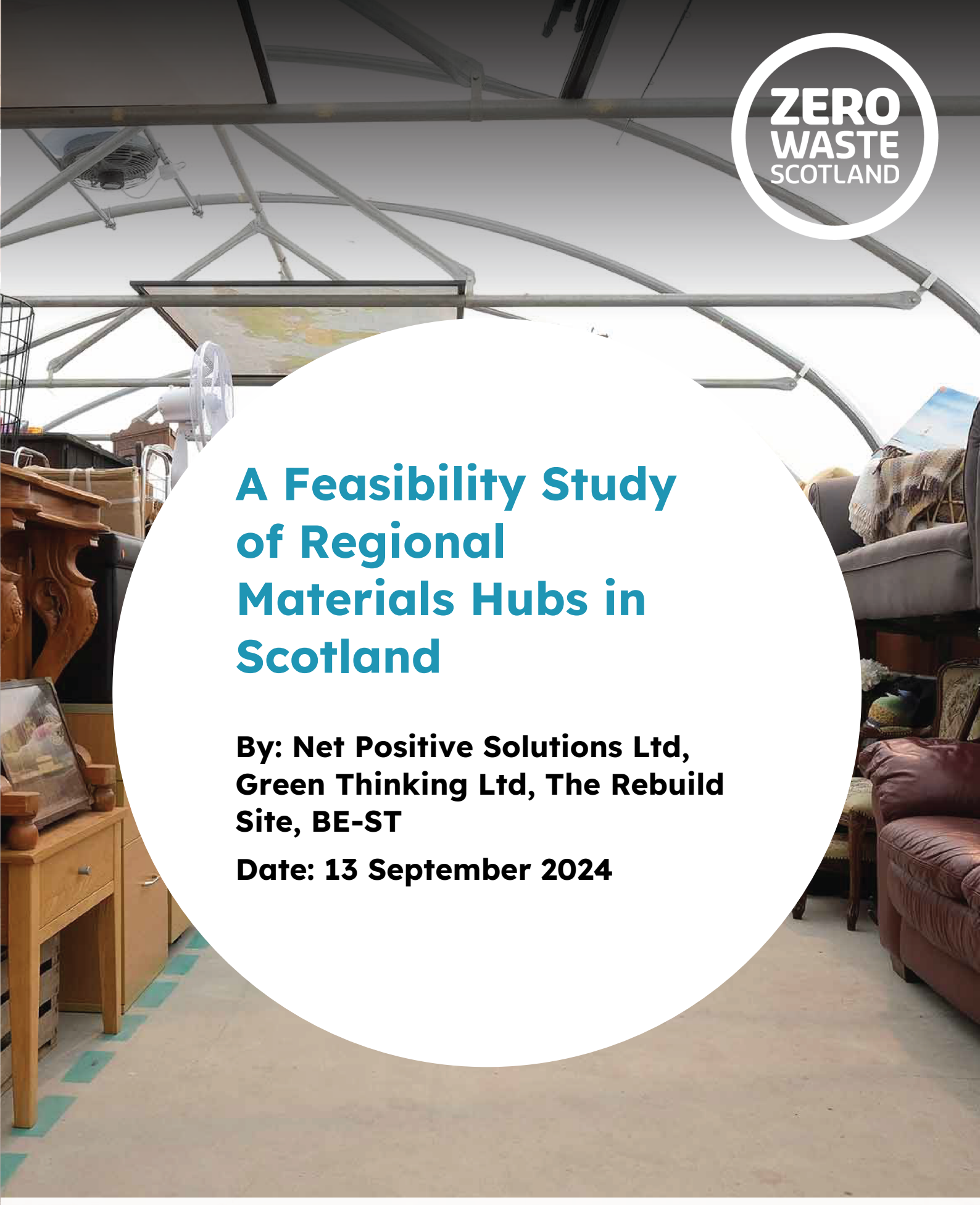

A Feasibility Study of Regional Materials Hubs in Scotland

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Date: 13 September 2024

Contents

1 Executive Summary

The objectives of this project were to demonstrate the feasibility of reuse hubs across Scotland and to explore whether regional reuse hubs are viewed as a viable means to reduce waste from construction and demolition activities. The project engaged with 116 national stakeholders and sectors, taking note of and incorporating regional differences. In particular, the project aims were to:

- Identify the barriers, enablers, actions and market opportunities (or not) for regional material hubs and reuse – focusing not only on supply, but also on the demand side from business and consumers at a regional and national level.
- Provide an understanding of where materials suitable for reuse arise (from surplus materials across the supply chain to refurbishment and demolition – pre- and post-consumer wastes).
- Identify regional disparity through the analysis of two regional case studies.
- Provide evidence that there is a market opportunity – or not – and set out recommendations on the feasibility of regional material reuse hubs, and potential scalability to create a national level network.

As various sections of this report show there is already an active reuse market for some high value construction (such as raised access flooring) and heritage products in the UK. These reuse facilities are diverse in their geography, structure, reach and items stocked and many are not well known outside of their immediate community.

Scotland uses on average 19.3 tonnes of resources per person per year, which is nearly 3 times the amount that is considered to be sustainable.[1] For Scotland to reduce its reliance on using virgin materials, measures need to be put in place to keep existing materials in circulation. The consolidation and expansion of a network of reuse hubs[2] is key for the reuse of products to move from ad hoc (i.e. non-routine occurrences) to regular business as usual. As such, next steps should include connecting, promoting and sharing best practice of existing reuse facilities, creating an environment to incentivise reuse (via legislation, but also by using environmental and financial levers) and piloting new reuse hubs.

This project engaged with Scottish construction industry stakeholders to further understand the feasibility of reuse hubs in Scotland and the regional disparities that exist through a survey (see section 4.1.1) , interviews (see section 4.1.3) and two workshops (see section 4.1.4). The study has found that two-thirds of workshop attendees were in favour of the establishment of more reuse hubs. There was a consensus that a hybrid model, which offered a digital presence but also a physical location would be the preferred set up. The outputs of this study have shown that there might be different models for setting up reuse hubs depending on the

[1] Zero Waste Scotland, 2023, Scotland Material Flow Accounts (SMFA) Model. Available at: https://cdn.zerowastescotland.org.uk/managed-downloads/mf-qrrfa3ry-1679488452d [Accessed 17 Oct. 2024].

[2] A reuse hub/facility is either a virtual platform where reused materials can be exchanged (free or for a fee) or a physical place where reused products can be brought in and sold on. Materials may be donated to the hub, and sometimes may be donated by the hub to charity projects

location. For example, in more remote areas the creation of community-based hubs would help to support the optimisation of local resources.

It was mentioned by participants attending the workshop that funding (from either public or private sector) would be required to prove the concept of reuse hubs.

There is significant appetite from industry across the UK to move forward and pilot circular economy activities, for example, our project team have experience in developing reuse pilot studies (e.g. The FIS Reuse Initiative), physical reuse sites (e.g. The Reuse Hub in Wolverhampton and The Rebuild Site in Carlisle), and roll out of a UK Materials Exchange Platform (e.g. Excess Materials Exchange). All these initiatives have required seed funding (from either public or private sector) to get established and as importantly for the capital expenditure required to scale.

The consolidation and expansion of a reuse network is key for the reuse of products to move from ad hoc to business as usual, as such the authors would recommend next steps to include the piloting of several reuse hubs, with a particular focus on urban locations and dealing with mainstream construction and demolition materials.

2 Introduction

There has been a growing global focus on the circular economy in recent years, this is reflected in Scotland where the Circular Economy Bill was published in 2023. It is being driven by the acknowledgement of the negative impact the extraction, use and disposal of products we use (including our buildings) has on our environment, and that many of our planet's resources are finite, as clearly demonstrated in the recent Friends of the Earth report 'Unearthing Injustice - A global approach to transition minerals'.[3]

The challenge: The circularity gap report Scotland 2022 report recommends that the reduction in material consumption of 11.2% across Scotland's built environment would lead to an 11.5% reduction in carbon emissions. Using the residential sector as an example, Scotland has an increasing need for new housing stock in urban centres, which is likely to put more pressure on the demand for resources. In order to balance the need to reduce materials consumption and the demand for new housing, the sector has to limit its use of virgin materials and increase the number of products and materials salvaged and reused from both the refurbishment and deconstruction of existing buildings.

There are an increasing number of reports including from the UK Green Building Council (UKGBC) and Ellen MacArthur Foundation clearly stating that circular economy strategies and practices – such as reuse of building materials and products - are crucial to hitting carbon reduction targets and mitigating further climate change. The key principles of a circular economy are to 1) design out pollution and waste, 2) to keep materials at their highest value for as long as possible, and 3) to be regenerative and restorative – or in other words to be 'more good' rather than 'less bad'; for example, cleaning up the river in addition to not polluting it.

To reduce the environmental impact of the construction industry, we need to shift away from the business-as-usual approach of take, make, use, dispose, as advocated by The Ellen MacArthur Foundation and the UKGBC. Changing mindsets, working from bottom up and top down to achieve a decarbonised, circular and more resource resilient society requires collaboration, creativity and innovation as well as supporting regulation and policy. This is reinforced in Scotland's circular economy report Circular economy and waste route map to 2030: consultation published in January 2024. The report highlights that Scotland uses on average 19.3 tonnes of resources per person per year, which is nearly 3 times the amount that is considered to be sustainable.

To maximise the materials within existing buildings, it is advisable to conduct a pre-refurbishment/pre-demolition audit – as required by the Greater London Authority (GLA) circular economy plans, for example. Knowing what is in the building before demolition or strip-out and what could be reused in situ, sold on or donated to commercial, charitable or community organisations, is key to facilitating reuse. Other fundamental aspects are the careful removal and storage of those products and materials, and the marketplace system that enables donors to quickly find recipients and vice versa.

In Europe, specifically in France, the Netherlands and in the UK (mainly in London due to the requirements from the Greater London Authority (GLA) to carry out circular economy

[3] Simms, J., Whitmore, A., and Pratt, K. (2023). Unearthing injustice: A global approach to transition minerals. [online] Friends of the Earth. Available at: https://foe.scot/wp-content/uploads/2023/05/Unearthing-Injustice.pdf [Accessed 17 Oct. 2024].

statements) reuse of construction products are on the rise and there are several digital platforms (such as the Excess Materials Exchange, Reyooz and Globechain) that have been created to enable the listing of reuse products. However, in the authors experience, products identified (these vary from project to project and depending on the client, warranty, availability or perceived risks) are most often reused within the community and charitable sector and not so much at a commercial level in new construction projects. It is often difficult to identify the donor and receiver projects at the right time, with the right quantity and quality of product in the right place. For these reasons, reusing construction products is often ad hoc.

However, change is afoot with some in the construction industry starting to strategically embed the reuse of materials into policy and guidelines for example: clients in the UK including reuse key performance indicators in their procurement processes (e.g., British Land); architects specifying reused materials (e.g., Orms and Marks Barfield); a growing number of digital platforms (examples as previously mentioned); and demolition contractors starting to see the value of deconstructing rather than to demolish (e.g., Lawmens, John F Hunt and Deconstruct). Whilst currently it is primarily being instigated by forward thinking organisations who are ahead of the curve, the trend will continue to grow as the focus shifts to carbon, resource and waste targets, and as the price of virgin resources continues to rise due to geopolitical tensions, supply chain issues and resource scarcity challenges.

Scotland has a blend of some very urbanised areas (in particular across the Central Belt) with rural and sometimes difficult to reach areas particularly in the South of Scotland and the Highlands and Islands which could affect the type of reuse hubs required. This study has engaged with stakeholders across the country to better understand the feasibility of reuse hubs and regional disparities.

3 Existing context

This section provides an overview of the findings based on the desk-based research that was carried out for this study.

3.1 UK and Scottish circular economy

In the UK, the Green Construction Board estimates that 60 million tonnes of construction and demolition wastes are generated every year[4]. Whilst over 90% are recycled, they tend to be downcycled which means the value of the products is lost or reduced. According to the report 'Embodied Carbon Status quo and suggested roadmap' for Zero Waste Scotland, the embodied carbon attributable to the Scottish construction industry is roughly 4-5 $MtCO_2e$/ year[5].

As the Scottish Government's 'Circular Economy and Waste Route Map to 2030: consultation' paper states, transforming the Scottish economy into a circular one where materials are kept in use for longer, is key to responding to the dual climate emergency and nature crises. Driven by the facts that 50% of global carbon emissions and 90% of global biodiversity loss and water stress are caused by resource extraction and processing,[6] some Scottish businesses have taken on these challenges and created opportunities turning what might otherwise be thrown away into valuable new products and services.

As the former Minister for Green Skills, Circular Economy and Biodiversity states: "To significantly cut emissions Scotland must reduce the demand for raw material in products, encourage reuse and repairs through responsible production and consumption, recycle waste and recover energy to maximise the value of any unavoidable waste that is generated. Cutting material consumption is one of the most important ways to limit environmental impact"[7].

An extract from the same consultation paper states that:

"Around 90% of the carbon impact of Scotland's waste is produced before disposal[8], during resource extraction, manufacturing, and transport. The way that products are designed and manufactured dictates their longevity, whether they can be reused or repaired, and how easily they can be recycled. The whole system needs to be reconsidered, reducing the need for new products, and maximising the life of existing ones."

Reducing and reusing waste are the first goals of the waste hierarchy and central to changing our relationship with materials and products. Building an economic system that moves away from being based on items that are designed to be disposable will bring significant environmental benefits.

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[4] The Green Construction Board (2021). Launch of the Green Construction Board Zero Avoidable Waste Routemap. Available at: https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2021/07/ZAW-Routemap-launch-22.7.21-FINAL.pdf [Accessed 17 Oct. 2024].

[5] Pomponi, F., Giesekam, J., Hart, J., D'Amico, B., (2020). Embodied carbon status quo and suggested steps. Available at: https://cdn.zerowastescotland.org.uk/managed-downloads/mf-x0da4o-r-1698760616d [Accessed 17 Oct. 2024].

[6] Scottish Government (2024). Scotland's Circular Economy and Waste Route Map to 2030 Consultation. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2024/01/scotlands-circular-economy-waste-route-map-2030-consultation/documents/scotlands-circular-economy-waste-route-map-2030-consultation/scotlands-circular-economy-waste-route-map-2030-consultation/govscot%3Adocument/scotlands-circular-economy-waste-route-map-2030-consultation.pdf [Accessed 17 Oct. 2024].

[7] Scottish Government (2022). Delivering Scotland's circular economy - route map to 2025 and beyond: consultation. Available at: https://www.gov.scot/publications/consultation-delivering-scotlands-circular-economy-route-map-2025-beyond/ [Accessed 17 Oct. 2024].

[8] Zero Waste Scotland (2020). The Carbon Footprint of Scotland's Waste. Available at: https://cdn.zerowastescotland.org.uk/managed-downloads/mf-eeu88d7q-1678115310d [Accessed 17 Oct. 2024).

The consultation paper states three main objectives in the Strategic Aims and Action section under Reduce and Reuse, one of which is entitled "Embed circular construction practices". The objective of this priority action is to support the development of regional Scottish reuse hubs and networks for the reuse of construction materials and assets (from 2025)[9].

As the above demonstrates, maximising resources and reducing both waste and carbon emissions and associated with that the adoption of circular economy strategies, models and practices is high on the Scottish Government's agenda.

3.2 Current policy and regulation relevant to circular economy & reuse

The objective of this report is not to review all the regulations, policies and legislation that are relevant to circular economy and waste - such as The Environment Act – however there are a couple of points worth highlighting that are particularly relevant to reuse hubs as below.

3.2.1 Waste regulations in Scotland

Reuse hubs often take construction materials of various types (rather than one specific material stream or product). It is therefore important to consider any issues related to waste regulations.

At the time of writing, Scottish Environment Protection Agency (SEPA) has issued guidance for anyone undertaking activities involving the reuse of products and materials within Scotland[10]. It is likely that a reuse hub would sit under Exemption 15 *"Beneficial use of waste without further treatment – no fee payable – unlimited duration"*. However, it is always recommended that any organisation setting up a new reuse hub in Scotland, or diversifying existing business practices to include reuse, seeks advice directly from SEPA to ensure any required licences are applied for and held. This Duty of Care becomes even more important if multiple parties are involved to ensure that all relevant parties are dealing with the products and materials as required by SEPA (and other authorities where applicable), to re-classify existing materials for reuse.

3.2.2 Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR) can accelerate progress towards a more circular economy, where products are designed to be reused, repaired, repurposed, remanufactured and easily disassembled for recycling at end of life, rather than just thrown away. Current EPR schemes in the UK are for packaging, waste electrical & electronic equipment, batteries and end of life vehicles. In the author's opinion EPR should drive improvements in reverse logistics infrastructure, supporting business models that promote a circular economy, and incentivising upstream design choices for more sustainable, low carbon and circular products. The Scottish Government, the UK and Welsh Governments and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland (DAERA), are consulting on reforms to the current

[9] Scottish Government (2024). Scotland's Circular Economy and Waste Route Map to 2030 Consultation. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2024/01/scotlands-circular-economy-waste-route-map-2030-consultation/documents/scotlands-circular-economy-waste-route-map-2030-consultation/scotlands-circular-economy-waste-route-map-2030-consultation/govscot%3Adocument/scotlands-circular-economy-waste-route-map-2030-consultation.pdf [Accessed 17 Oct. 2024].

[10] SEPA (2024). Reuse Activities and Waste Regulation. Available at: https://www.sepa.org.uk/media/3nqaqafj/wst-g-051-reuse-activities-and-waste-regulation.pdf [Accessed 17 Oct. 2024].

producer responsibility system for waste electrical and electronic equipment (WEEE) which will introduce extended producer responsibility (EPR) from 2026[11]. There is currently nothing specifically in the UK for construction products or buildings.

3.2.3 Revolve

Whilst Revolve is not policy or regulation it is important to mention as an enabler for reuse in Scotland. Revolve is Zero Waste Scotland's support programme for the reuse sector in Scotland. Revolve offers information and resources to support reuse businesses to meet legal obligations, follow best practice and to work more effectively and efficiently. Revolve offers expert knowledge and training to the reuse sector to be able to work compliantly and to a high standard.[12]

3.3 Review of Relevant Reports that cover Materials Reuse

Several reports mention that key advantages of reusing construction materials and products include:

- Decreasing the use of primary resources and reduction of carbon emissions and waste. (e.g., Scottish Government's Circular Economy and Waste Route Map to 2030 [13])
- costs savings (e.g., Evaluating reuse potential Material profiles re-use vision for project workflow, Arup [14]; Maximising re-use of materials on-site, Resource Efficient Scotland/ Zero Waste Scotland [15])
- social value (e.g., Job Creation in the Re-use Sector: Data Insights from Social Enterprises, RREUSE [16])
- wider biodiversity benefits (e.g. The benefits to biodiversity of a strong circular economy, European Environment Agency [17])

Many of the reports also cite legislation, regulation and policy as key levers for the adoption of circular strategies, including reuse (for example the Systems Enablers for a Circular Economy[18]). The outcomes of the consultation document and how the government incorporates these into the Route Map to accelerate the take up of reuse has the potential to

[11] Zero Waste Scotland (2023). Extended Producer Responsibility. [Online] www.zerowastescotland.org.uk. Available at https://www.zerowastescotland.org.uk/resources/extended-producer-responsibility [Accessed 17 Oct. 2024].
[12] Zero Waste Scotland (2023). Revolve. [Online] www.zerowastescotland.org.uk. Available at https://www.zerowastescotland.org.uk/revolve [Accessed 17 Oct. 2024].
[13] Scottish Government (2024). Scotland's Circular Economy and Waste Route Map to 2030 Consultation – Supporting documents. Available at: https://www.gov.scot/publications/scotlands-circular-economy-waste-route-map-2030-consultation/documents/ [Accessed 17 Oct. 2024].
[14] ARUP (2021). Evaluating re-use potential: Material profiles and vision for project workflow. [online] www.arup.com. Available at https://www.arup.com/insights/evaluating-re-use-potential-material-profiles-and-vision-for-project-workflow/ [Accessed 17 Oct. 2024].
[15] Resource Efficiency Scotland (2017). Maximising re-use of materials on-site [online] zerowastescotland.org.uk. Available at https://cdn.zerowastescotland.org.uk/managed-downloads/mf-ncqf2g29-1677500986d [Accessed 17 Oct. 2024].
[16] RReuse (2021). Job creation in the re-use sector: Data insights from social enterprises. [Online www.rreuse.org]. Available at https://rreuse.org/job-creation-in-the-re-use-sector-data-insights-from-social-enterprises/ [Accessed 17 Oct. 2024].
[17] European Environment Agency (2023). The benefits to biodiversity of a strong circular economy. [Online www.eea.europa.eu]. Available at https://www.eea.europa.eu/publications/the-benefits-to-biodiversity#:~:text=Circular%20economy's%20contribution%20to%20halting%20biodiversity%20loss&text=Lower%20demand%20for%20primary%20resources,into%20cropland%20or%20monocrop%20plantations. [Accessed 17 Oct. 2024].
[18] UK GBC (2023). System Enablers for a Circular Economy. [Online www.ukgbc.org). Available at https://ukgbc.org/wp-content/uploads/2023/01/Circular-Economy-System-Enablers-Report.pdf [Accessed 17 Oct. 2024].

provide further opportunities. The Scottish Government recognises the key role reuse hubs have in facilitating the reuse of construction materials[19] .

The UK Green Building Council (UKGBC) 'Systems Enablers for a Circular Economy' report[20] identified 8 industry enablers, one of which was establishing a functioning, easily accessible marketplace for secondary construction materials. As the report states "There are currently two main approaches – reuse hubs and manufacturers offering refurbished products. Both hold value, depending on the type of product. Simpler building materials such as bricks, steel, and insulation are suited to reuse hubs, while more technical products are better suited for manufacturer schemes – for example, refurbished lighting, raised access floors, and glass partitions."

Based on the author's experience; to overcome the shortage of storage for secondary or reused materials, local reuse hubs can offer a feasible solution. Physical hubs contribute to a functioning secondary materials market which is essential for mainstreaming the procurement of reused building materials by making this process easier and more accessible. Physical hubs provide more time to match donor with recipient, should enable better quality control and overall facilitate the development of higher value secondary markets.

Education is also a key enabler and cited as such in the UKGBC report. There is a need to educate practitioners and decision-makers – including more guidance on the reclamation and reuse of specific materials as well as better dissemination of existing information on how to go about "*reusing*" - there are some excellent resources already (e.g. Resource Efficient Scotland/Zero Waste Scotland, the FCRBE research and ARUP work) but 'mainstream' businesses as well as those already passionate about sustainability need to be aware of them.

Hybrid hubs offer a digital interface as well as a physical facility which provides a better understanding of what is available and in stock. However, in the author's experience, the cost of the digital solution needs to be considered as it is likely to be a barrier for smaller hubs, such as the community ones. This is due to both the initial financial and time investment to set up the digital system and then also the time to ensure the information on the system is kept accurate and up to date. The ability to view and "*touch*" the products in physical hubs can be seen as positive. A physical hub might also be used to sort, grade and test products.

The Circular Building Hubs[21] report sums up the requirements for reclamation and reuse at a commercial level in this statement - "to maximise the effectiveness of bringing demand and supply together there needs to be both physical infrastructure (transport and delivery, storage, possible (re)processing) and digital infrastructure (data, e.g. materials passport information, carbon, availability, condition, quantity, cost, possible match)".

[19] Scottish Government (2024). Scotland's Circular Economy and Waste Route Map to 2030 Consultation – Supporting documents. Available at: https://www.gov.scot/publications/scotlands-circular-economy-waste-route-map-2030-consultation/documents/ [Accessed 17 Oct. 2024].
[20] UK GBC (2023). System Enablers for a Circular Economy. [Online www.ukgbc.org). Available at https://ukgbc.org/wp-content/uploads/2023/01/Circular-Economy-System-Enablers-Report.pdf [Accessed 17 Oct. 2024].
[21] Metabolic (2022). Circular building hubs: The circular tool box. [Online www.metabolic.nl). Available at https://www.metabolic.nl/publications/circular-building-hubs/ [Accessed 17 Oct. 2024].

3.3.1 The size of the opportunity

Barbour ABI and Glenigan are two of the largest research agencies offering construction project information in the UK. Barbour ABI publish a list each year highlighting the total value of the 'Top 100 Construction Projects in Scotland'. [22] For 2023 this value was £66,193,246,000. These projects all require millions of tonnes of materials, approximately 100 million tonnes of materials were used by the construction industry in the UK in 2018[23].

On the other hand, 77,745 homes have been demolished in Scotland since 1999, while the UK overall demolishes 50,000 buildings a year, particularly targeting social housing[24].

Over a period of five years (2017- 2022), an average of 993 demolitions have been reported in Scotland annually, although it is thought the actual number of buildings demolished is much higher as these statistics exclude many private demolitions[25].

On the other hand, requirements such as the circular economy planning statements[26] are encouraging developers and design teams to review their projects to better understand the flow of materials that is going in and out of proposed development and demolition projects. The required pre-demolition audits provide a great opportunity to gain an early understanding of the materials that may become available if a building is deconstructed which could, in theory be matched with the resource required to meet the needs of the construction industry.

3.3.2 Existing Reuse Hubs

A desktop study of existing reuse hubs operating currently, both in and outside of the UK was undertaken. For the purpose of this study, a reuse hub can either be:

- A digital platform that enables the creation of a marketplace for the buying/selling of reused products or
- A physical reuse hub where buyers/takers can physically see the reused products.

3.3.2.1 Physical reuse hubs in Scotland

There are several examples of Reuse Hubs currently operating in Scotland, including but not restricted to construction and related materials and products. From small salvage companies to more recently established community reuse hubs, there are many existing examples of organisations dealing with the reclamation and/ or repair and reuse of products and materials

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[22] Barbour ABI (2024). Top 100 Construction Projects in the UK. [Online www.barbour-abi.com). Available at https://barbour-abi.com/top-100-construction-projects-uk/ [Accessed 17 Oct. 2024].
[23] Drewniok, M., Manuel Cruz Azevedo, J., Dunant, C., Allwood, J., Cullen, J., Ibell, T., Hawkins, W. (2023). Mapping material use and embodied carbon in UK construction, Resources, Conservation and Recycling, Volume 197, Available at https://www.sciencedirect.com/science/article/pii/S0921344923001921 [Accessed 17 Oct. 2024].
[24] Harper., P., (2023). Britain is addicted to the wrecking ball. It's trashing our heritage and the planet. [Online www.theguardian.com). Available at https://www.theguardian.com/commentisfree/2023/feb/10/britain-#:~:text=The%20obliteration%20of%2050%2C000%20British,neighbourhoods%20and%20accelerating%20climate%20breakdown [Accessed 17 Oct. 2024].
[25] CIOB (2022). Scottish government urged to protect Scotland's built environment from unnecessary and 'cheap' demolition. [Online www.ciob.org). Available at https://www.ciob.org/news/scottish-government-urged-to-protect-scotland%E2%80%99s-built-environment-from-unnecessary-and-%E2%80%98cheap%E2%80%99-demolition#:~:text=Over%20the%20last%20five%20years,statics%20exclude%20many%20private%20demolitions [Accessed 17 Oct. 2024].
[26] London Assembly (2024). **Circular Economy Statement Guidance.** [Online www.london.gov.uk/). Available at https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-plan-guidance/circular-economy-statement-guidance [Accessed 17 Oct. 2024].

in Scotland. They are diverse in their geography, structure, reach and items stocked and many are probably not widely known outside of their immediate community.

A list of reuse hubs available in various locations in Scotland, can be shown in Figure 1 below, based on the research team's findings at the time of writing. Further details can be found in the appendix.

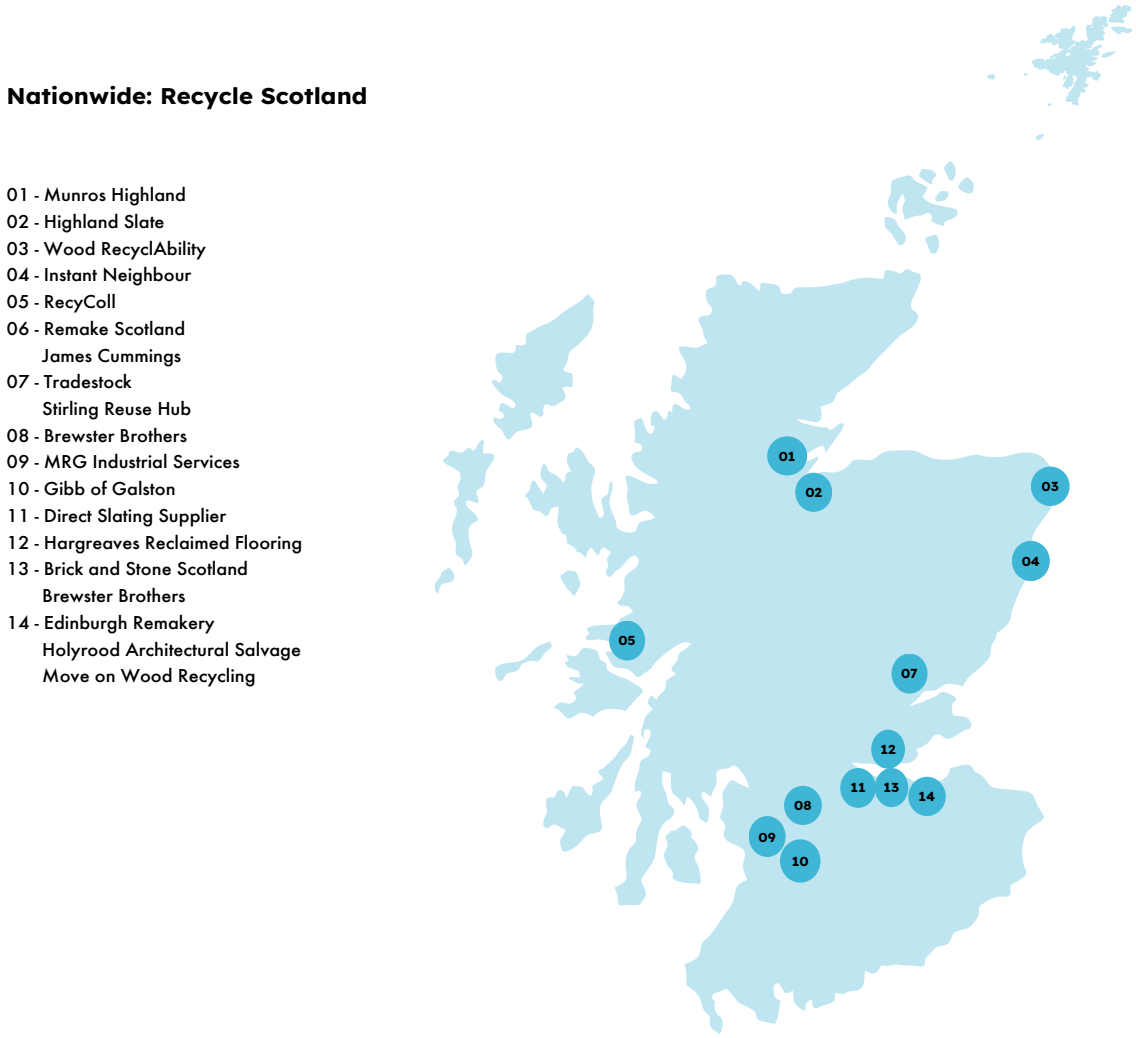


Figure 1 - Map of reuse hubs in Scotland

3.3.2.2 Physical reuse hubs operating UK wide

- **Community Wood Recycling** – a nationwide network of 30 wood recycling organisations www.communitywoodrecycling.org.uk/
- **Salvo/ Salvoweb** – Comprehensive architectural salvage directory. www.salvoweb.com/salvo-directory/category/all/location/uk/region/all
- **Carpet Tile Wholesale** - one of the first companies in the UK to process used carpet tiles, they make sure all their recycled carpet tiles come from carefully selected sites across the UK. www.carpettilewholesale.co.uk/all-recycled-carpet-tiles
- **Community RePaint** - is a UK wide paint reuse network, sponsored by Dulux, that aims to collect this leftover paint and redistribute it to benefit individuals, families,

communities and charities in need at an affordable cost. www.communityrepaint.org.uk/

The following reuse hub has depots in England but is worth noting as an interesting model to review:

- **The Rebuild Site** – Taking surplus materials from construction sites and the construction/DIY supply chain and putting them to good use. The facility in Carlisle is operated solely by The Rebuild Site, the facility in Wolverhampton is a collaboration between Rebuild and ASAN Wood Saints (the latter being part of the Community Wood Recycling Network), it is called The Reuse Hub. (www.rebuildsite.co.uk)

3.3.2.3 Digital reuse hubs in Scotland and the UK

It is more difficult to put boundaries on the operation of a digital platform and many that apply in the UK can also therefore apply in Scotland. Examples as follows:

- **Materials Exchange** – An innovative B2B digital platform to reuse materials and to facilitate connections between 'donor' and 'recipient' construction projects. Ref: Enfield Council's Materials Platform.
- **Globechain** – Online reuse marketplace with ESG data offer, connecting enterprises with non-profits, small businesses and people to redistribute unwanted items. globechain.com
- **Enviromate** – Free and cheap building materials for construction or DIY projects.www.enviromate.co.uk/
- **Material Reuse Portal** (ReLondon Circuit project) – Material Reuse Portal bringing together construction materials from multiple marketplaces to create a single place where reusable materials can be found. wwwmaterialreuseportal.com/
- **Circotrade** – Trading platform to facilitate and unlock the future value of building's materials. www.circotrade.com/
- **Recolight** – Platform to promote the donation of new and used lighting products and equipment. www.recolight.co.uk/reuse-hub/
- **Traco** – Clearance, storage and relocation services from one source, enabling goods to remain in use for longer by selling quality used assets. www.recycledassets.co.uk/
- **Envirocycle London** – Diverts post-consumer carpet tiles from landfill to reuse. After recovery & grading, carpet tiles are then supplied to charities, schools, businesses, contractors & the public for reuse. www.envirocyclelondon.com/
- **Sustainability Yard** - Buy/sell or giveaway excess building or DIY materials for FREE and stop them from going to landfill, or even worse, having to pay to put it in a skip. www.sustainabilityyard.com/
- **Material Index** – act as a broker for companies wanting to source reclaimed products and materials. www.material-index.co.uk/index.html#brokerage
- **CollectEco** – www.collecteco.co.uk/ helping companies donate furniture to good causes.
- **Renee Materials** – Digital hub for creatives, makers and designers in London with materials sourced from across all sectors. www.reneematerials.co.uk/
- **Ebay** – Buy and sell construction materials. www.ebay.co.uk/
- **Facebook Marketplace** - www.facebook.com/marketplace/

- **Another list of platforms/hubs** - www.istructe.org/resources/climate-emergency/circular-partnerships-database/
- **Institute of Structural Engineers circular database** www.istructe.org/resources/climate-emergency/circular-partnerships-database/
- **Supply Chain Sustainability School** central database of local Materials Exchange Platform (MEP) projects (those in Scotland are already covered in the above lists): www.supplychainschool.co.uk/school-launches-new-mep-mapping-tool/

3.3.3 Manufacturers' take back schemes

Take back schemes are operated by manufacturers where they agree to take back their product when it has come to the end of its current life. Take back schemes sit within the reuse hub ethos in that reuse is generally the priority albeit for specific products from specific manufacturers rather than the wider remit of a hub. Take back schemes may also disassemble products for recycling either to go back into their own manufacturing processes or moved on to others, this is done when the product is too damaged to be repaired or refurbished. Examples of take back schemes include:

- RMF for raised access floors – recycling and reuse
- Armstrong for mineral ceiling tiles – closed loop recycling
- SAS for metal ceiling tiles - closed loop recycling and reusing
- Optima partitions - recycling and reuse (just their own at the moment)
- Council for Aluminium in Buildings – closed loop programme
- Knauf Plasterboard Recycling Scheme
- British Gypsum plasterboard (closed loop recycling) and pallets (reuse and recycling)
- Recofloor vinyl flooring scheme – for recycling
- Rockwool – closed loop recycling
- Protec (temporary protection sheets)- closed loop recycling
- Interface – reuse and closed loop recycling
  Tarkett/Desso – closed and open loop recycling of many flooring products including not their brand.

It is important to note that not all the take back schemes listed above are reuse schemes. Some products cannot be reused and closed loop recycling[27] might be the best option for those materials.

3.4 Source of reused materials

The delivery of the right products at the right time on site is key to ensure there is no delay to programme – and therefore avoid what can be serious financial consequences. Project timelines are tight, with little margin for error, not least due to investment pressure to complete as soon as possible to sell or lease the building. It is therefore not uncommon for contractors to over order to ensure they have the right amount of materials on site at the right time, taking into consideration partial damage or complete breakage through inappropriate storage or mishandling.

[27] Closed loop recycling means it goes back into the manufacturing system to be made into the same product e.g. commercial flat glass gets broken into cullet which goes back to a glass manufacturer to be made into new panes of flat glass.

These surplus materials have great potential to be reused. These unused materials could be sourced from contractors, and interior fit out companies that may be willing to donate (or perhaps resell) surplus products and materials. The current challenges are to identify the current stock of available surplus products and matching it with the demand. Figure 2 below illustrates sources of surplus and post-consumer wastes that could be reused might arise.

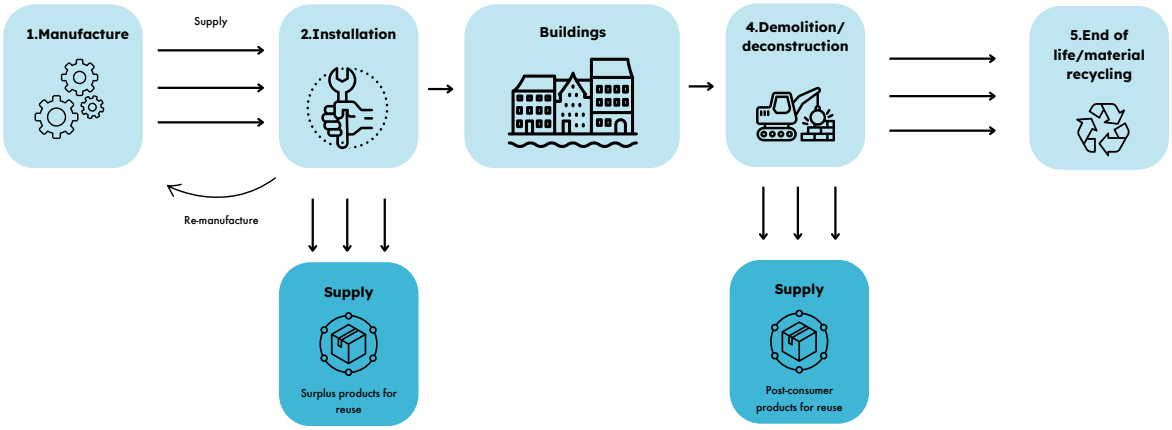


Figure 2 - Diagram explaining opportunities for surplus and post-consumer waste

In addition to surplus materials, another source of reused product *pre-consumer* (i.e., before it has been used even once) is from construction/ DIY supply chain organisations that may be prepared to donate end of line products to a community level hub. Some examples of companies that may have end of line products surplus to requirement are listed below:

- Travis Perkins
- Jewson
- Howdens
- IBT
- St Andrews Timber & Building
- B&Q
- Wickes
- Homebase

Additional organisations can be found at www.buildscotland.co.uk/d_m/94,-1/scotland/builders -merchants.

Looking at the overall marketplace for construction materials, Table 1 outlines the different types of organisations that supply to the built environment sector. From the authors' perspective, the table identifies potential advantages and disadvantages of different types of organisations selling new materials vs surplus or (re)used/reclaimed products.

Table 1 Overview of organisations that supply to the built environment

Type of company	Example	Advantage	Disadvantage
Builders' merchant **(new materials)**	Jewson, B&Q	- Guarantee of quality - Ability to browse in person - Wide range	- No heritage (i.e., architectural salvage for historic or listed building conservation) products - Typically higher embodied carbon than reused products
Online retailers **(new materials)**	Materials Market (Trading UK Ltd), CMO Group Plc (Construction Materials Online)	Wide range of products and guarantee of quality.	- Not able to browse/ see product before delivery - Typically higher embodied carbon than reused products
Salvage company **(reused materials)**	Many examples on Salvoweb	- Heritage value, uniqueness (i.e., architectural salvage for historic or listed building conservation) - Access to products no longer available elsewhere - Lower carbon than new products	- Limited stock and quantities – hard to match supply and demand at the right time - Not able to browse/ see product before delivery
Digital/ online reuse platforms **(reused materials)**	Excess Materials Exchange, Enviromate	- Can be lower costs or free - Lower carbon than new products	- Limited stock and quantities – hard to match supply and demand at the right time - Not able to browse/ see product before delivery
Physical and/or hybrid reuse hubs **(reused materials)**	The Rebuild Site, Meridian Water Excess/ Materials Exchange initiative	- Can be lower costs or free - Provides a physical location convenient for customers so able to browse and see products - Lower carbon than new products	Limited stock and quantities – hard to match supply and demand at the right time

3.4.1 Reuse hubs operating models

Currently, most construction materials reuse hubs provide small quantities of a large number of products. For the purpose of this study, these are referred to as community hubs. The products

are sold as seen and people choose to shop at a reuse hub because the products are cheaper or because they agree with the ethos. However, to scale up the reused products market, there is a need to create hubs that can provide bigger quantities of specific products to supply Tier 1 contractors on large projects - these are referred to as commercial hubs.

This section of the report explores the two approaches to the hubs, who might access them and how their operation and requirements differ. Findings are provided in Table 2 below.

Table 2 Overview of community and commercial hubs

	Community hubs	Commercial hubs
Target audience	• Small trades who require small quantities • Local community groups • Facilities Management companies (e.g. maintenance staff for schools, care homes etc) • DIYers/ self-build • Gardeners and crafters • Social housing sector • Scottish Men's Sheds Association[28]	• Tier 1 contractors or sub-contractors • Architects • Developers • House builders • Social housing sector • Facilities Management companies (e.g. maintenance staff for schools, care homes etc)
Space requirements (considering volumes and level of processing and services required)	Products sold as seen, potentially with the capacity to take in damaged items for repair or reprocessing which may then require a waste carriers' licence according to SEPA[29]	Generally require more space due to the quantities involved, and capacity to provide an additional layer of processing due to much more stringent requirements around quality control, potentially requiring remanufacturing, re-warrantying and any requirements from the waste handling regulations.
Suggested location	• Existing reuse hubs of other products and materials e.g. existing hub selling furniture and household goods. • Extension to existing waste contractors or recycling centre • Alongside household recycling centres • New facility in warehousing/ industrial areas close to conurbations	• New facility in warehousing / industrial areas close to conurbations, in particular where a lot of new development is being planned. • Possibility of 'pop up' facilities as part of a central reuse provider offer (hub and spoke model) to best serve larger developments with multiple projects and construction teams (i.e. have a 'spoke' closer to the development to minimise miles

[28] Scottish Men's Shed association. Available at https://scottishmsa.org.uk/
[29] SEPA (2024). Reuse Activities and Waste Regulation. Available at: https://www.sepa.org.uk/media/3nqaqafj/wst-g-051-reuse-activities-and-waste-regulation.pdf [Accessed 17 Oct. 2024]

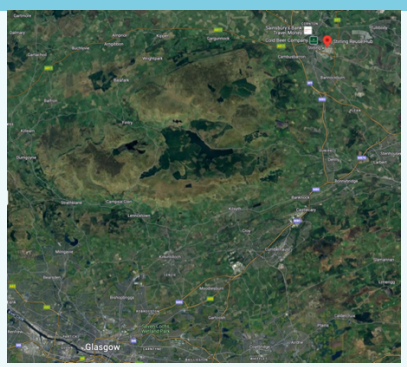
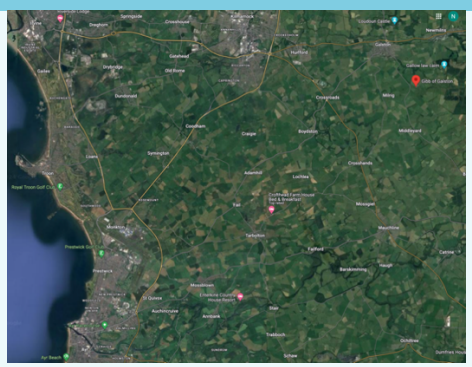
		travelled re carbon and ease of drop off and collection) • Extension to existing waste contractors/ manufacturer/ builders' merchants
Who best suited to run them	• Community groups, likely to be run as a social enterprise, charity or Community Interest Company (CIC). • Extension to an existing business where they are wanting to find a good home for their (and/or their supply chain's) surplus products/materials and deliver positive social and environmental impact, can act as a hub for theirs and related products in their area – such as Weatherhead Shop Designers Ltd and their Equipment Rescue Centre	• Storage company • Digital hub that is expanding to include storage facility. • (closed hub) Contractor for their own clients and supply chain • Councils – closed for a certain very local geography or open to a wider range of companies, potentially collaborating with nearby local authorities. • Manufacturer for their own and/or related product groups (e.g. flooring, lighting…) • Existing community facility looking to expand/ diversify. • Existing retailer, wholesaler, distributor, recycler, waste management company looking to expand/ diversify – such as Recycle Scotland and Brewster Brothers
Benefits	Often linked to social value impact due to complementary activities such as skills workshops and tool libraries that are provided in addition to the sale of materials, and the community aspect of offering volunteer opportunities and a safe, social space for those that require it. Local job creation	Provide supply of reused products to large construction projects enabling those projects to reduce their embodied carbon impact and decrease habitat depletion and other related extraction and manufacturing negative impacts. Upskilling opportunities and job creation

Given the relative infancy of the sector and the fact that new reuse hubs may be setting up 'from scratch' both models probably need to have additional, connected and complementary, offers such as a Repair Cafe (community) or repair & remanufacture services (commercial), and/ or perhaps selling some new stock as well as reused to ensure there is sufficient and maintained footfall/ use of the facility. Examples include Stirling Reuse Hub and their maker spaces, Gibb of Galston with their animal feed and accessories business and Recycle Scotland continuing to offer new products as well as reused products.

3.4.2 Regional disparity of existing reuse hubs in Scotland

Table 3 below compares and highlights two different reuse hubs in different regions in Scotland. One example is in a rural location and the other is in a more central semi-urban location.

Table 3 Two examples of reuse hubs illustrating the regional differences

	Stirling reuse hub	Gibb of Galston/The Timber, Architectural Salvage and Stone (TASS)
Location		
Urban or Rural	Semi-Urban (Industrial estate on the outskirts of Stirling City Centre)	Rural (farmland)
Target Market	Local communities	Predominantly individual customers
Sources of income	Approximately 40% from direct sales, 30% from employability grants to support people furthest from the workforce, and 30% funding through research and collaborative projects e.g. to carry out feasibility studies and other activities.	Self-funded. Sale of reclaimed products and materials.
Business model	Environmental charity	Private business
Key differentiator	Maker space to support resale of goods and to promote development of skills – this would not be possible in a rural setting as it would be out of reach to its customer base. Stirling reuse hub is planning to open another branch in the city centre to capitalise on the higher footfall and be more convenient for customers wanting their	Whilst in a rural location, the TASS claim that individual customers travel out of their way to come to visit the reuse hub due to their unique offerings – a destination built around an existing sawmill; focus on renewable materials; expanses of countryside (Threepwood

	household goods. The reuse hub can see that moving smaller stock into the city could open an opportunity to expand on the occasional construction material stock they receive. Having more of a focus on construction materials would be more suited to their larger slightly more out of town facility.	Farm) and antique architectural salvage and garden supplies.

Whilst in very different geographical locations, both Stirling Reuse Hub and TASS have capitalised on their individual locations through their business models to attract customers. For the Stirling Ruse Hub (semi-urban), this is accessibility and offering of a maker space to grow footfall, and for TASS, whilst the location (rural farm) is remote, their customer base seems to be attracted to the reuse hub due to its unique location and setting, and reputation for their choice of salvaged materials. These full case studies (including others in Scotland) can be found in the Appendix.

Interestingly, the authors were unable to find any established examples of commercial scale reuse hubs to support the construction sector in Scotland – most of the reuse hubs in Scotland generally offer furniture, fixtures and fittings and limited commercial scale construction products and materials. The examples chosen (in the Appendices) are therefore generally either where there is a community need or gap in the market for specific architectural salvage items. The analysis section will further explain the findings of what stakeholders feel is needed to service requirements for both urban and rural locations in future.

4 Methodology for stakeholder engagement

The objectives of this project were met by gathering suitable evidence through an online survey, two workshops and 20 interviews tailored to the relevant stakeholders using the project team's extensive knowledge and recent experience (i.e. Enfield storage, EME, Rebuild Site CIC, BE-ST Fest outputs, FIS reuse pilot project).

4.1 Stakeholder engagement

The project consisted of several activities engaging several stakeholders as seen in Figure 3 below.

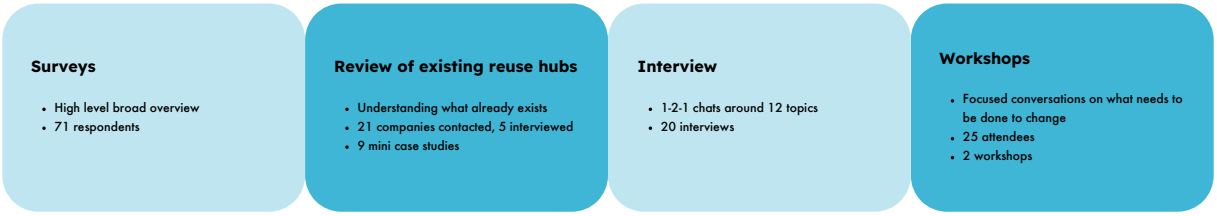


Figure 3 - Diagram showing the project methodology and themes explored

In order to meet the project objectives, the team carried out a number of tasks described below:

4.1.1 Task 1: Survey – stakeholders across the different Scottish regions

The aim of this task was to gather the views of stakeholders on current practices in relation to the reuse of construction products across different areas of Scotland. This engagement also enabled the project team to gather interest and feedback on the potential to increase reuse across Scotland.

Focus was given to identify and categorise stakeholders across various disciplines, the stakeholders that could supply reused products, the enablers to reusing products, the potential owners of reuse hubs, the end users who will ultimately drive the demand for this service. The targeted stakeholders included: contractors, subcontractors, architects, manufacturers, pre-demolition auditors, waste management companies, local authorities and other public sector clients, distributors and developers. The stakeholders covered a broad range of geographical areas to ensure regional specific demands, barriers and opportunities were accounted for.

The next part of this task was to create a survey and to issue it to a broad range of stakeholders from the construction industry operating in Scotland. The aim of the survey was to gather general views of the industry in relation to the implementation of reuse hubs and interest in reusing construction products in Scotland.

71 responses to the survey were received. A summary of survey findings can be found in section 5.1.

4.1.2 Task 2: Desktop analysis of existing physical and virtual reuse platforms

The aim of this task was to use desk-based research to explore and understand the current context for reuse of construction materials and assets in Scotland. This task collated information on the viability of Reuse Hubs in Scotland through a review of the current landscape with a focus on circular economy in the built environment; construction project data including high level material mapping; identifying lessons learnt from key examples of Reuse Hubs currently operating, both in the UK and internationally; and a review of existing facilities/organisations.

To meet the aim of this task, the team carried out a review of reports and information available online driven by the team's extensive background knowledge of reuse (see Appendices).

In addition, an email was sent to 21 organisations (See Figure 4) which was followed up by conversations with the following organisations all of which have physical premises:

- **The Wood RecyclAbility in Ellon** – manufacturing upcycled, reclaimed, recycled and reused wood products
- **Recycle Scotland** – reused and remanufactured workplace furniture
- **Gibb of Galston** – architectural salvage, timber and buildings materials
- **Remake Crieff** - community reuse hub dealing with mixed products, mostly household goods, with occasional construction materials stock, includes tool library and repair café.
- **Stirling Reuse Hub** - community reuse hub dealing with mixed products, mostly household goods, with occasional construction materials stock, includes library of things, maker spaces and skills workshops
- **Brewsters** (Construction, demolition & excavation waste recycling)

The output from this research was used to feed into the interviews (section 4.2) and workshops (section 4.3).

4.1.3 Task 3: Interviews

20 people were interviewed via a 30-45 min Teams call. The aim of the interviews was to gather more in-depth information in relation to reuse hubs in Scotland across the following 12 themes:

- Opportunities
- Challenges
- Market demand
- Location of hubs
- Business model of hubs
- Logistics
- Planning requirements
- Regulatory issues
- Disparities between locations
- Products
- Labour and skills
- Dealing with supply

4.1.4 Task 4: Workshops

25 individuals took part in 2 one-hour workshops. Workshop 1 focused on urban setting and workshop 2 focused on the rural context. The workshop focused on what needed to happen to make reuse hubs successful and move reuse from ad hoc to the new 'established practice'. The aim of the workshops was to focus further on the barriers, enablers and opportunities associated with the reuse of materials and products. The workshops considered topics such as: logistics, materials supply and demand, type of materials, the role of pre-demolition and pre-refurbishment audits to capture data. The attendees carried out two exercises:

- Exercise 1 asked attendees to sort the products into level of demand and difficulty of reuse.
- Exercise 2 asked the attendees to provide feedback on what actions should be taken for reuse to become 'business as usual'. This exercise considered two approaches to reuse hubs: community-based hubs and commercial hubs. The themes discussed included: regulation/ planning/ contract, location, importance of data and communication/ engagement, skills, roles of digital reuse hubs, role of physical reuse hubs, warranty, economic and environmental/social benefits.

4.2 Stakeholder engagement analysis approach

A systematic review of the findings was conducted. First the results of the survey were extracted from Survey Monkey to create graphical representation of the results. Some of the results were presented to the workshop attendees to stimulate thoughts and discussions.

The interview findings were transcribed in Excel by the members of the team who carried out the interviews. The results were then transferred to a Miro board where they were grouped by stakeholder groups:

- Clients/developers (3)
- Architects, designers, engineers (6)
- Manufacturers (2)
- Waste and resource management (1)
- Contractors (5)
- Local authorities (2)

The responses were collated and then presented per stakeholder group.

The workshops' findings were analysed for each workshop before being collated and summarised. The analysis of the exercises was carried out as follows:

Exercise 1: the Post-It notes placed on the board by the delegates were colour coded and grouped (where possible) on a board in a location representative of where the most Post-It notes were per product. Each product has a different colour Post-It to make it visually easier to evaluate.

Exercise 2: the discussions (both verbal and from the notes written by the workshop attendees) for community-based hubs and commercial hubs were summarised and then reported against the themes of the exercise to differentiate between community-based hubs and commercial hubs.

5 Results and analysis of stakeholder engagement

5.1 Survey results

In the first instance, a survey was issued to gather a wide but shallow view across stakeholders in the built environment on attitudes to reuse. The survey was sent out through BE-ST social channel, newsletter and through direct communications with several relevant organisations. The survey was also utilised to gather interest in further project participation. In total, 71 individual responses to the survey were received – this covered a broad range of stakeholder groups, organisation sizes and geographical reach as shown in Figure 4, 5 and 6 below:

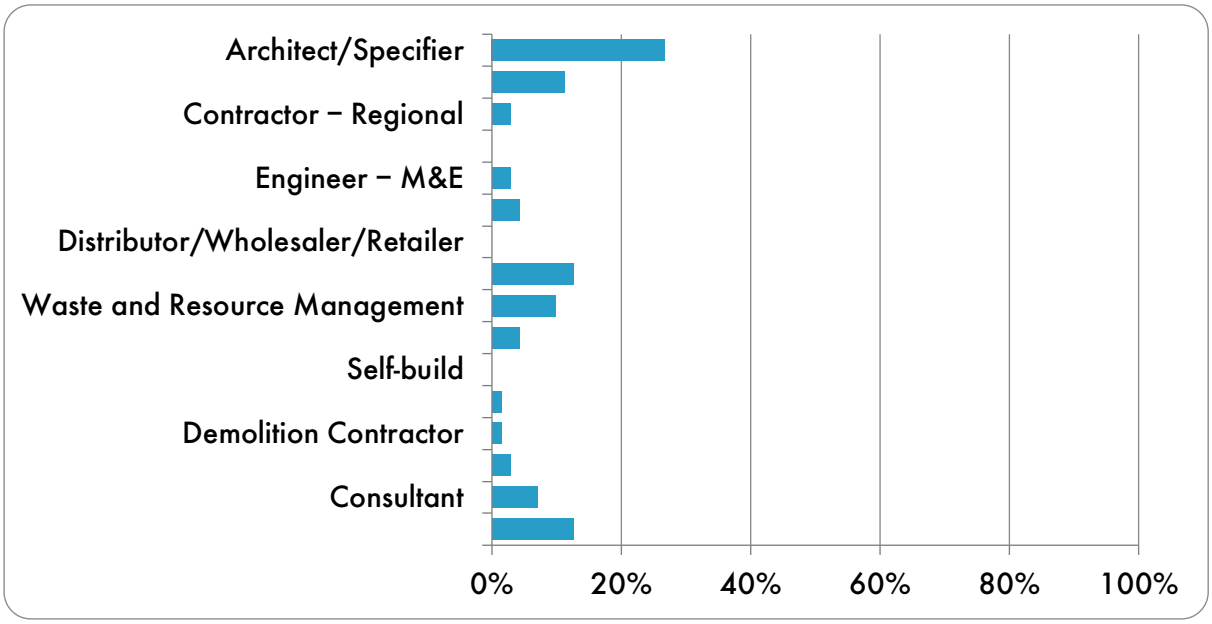


Figure 4 - Graph explaining survey results of respondent's business

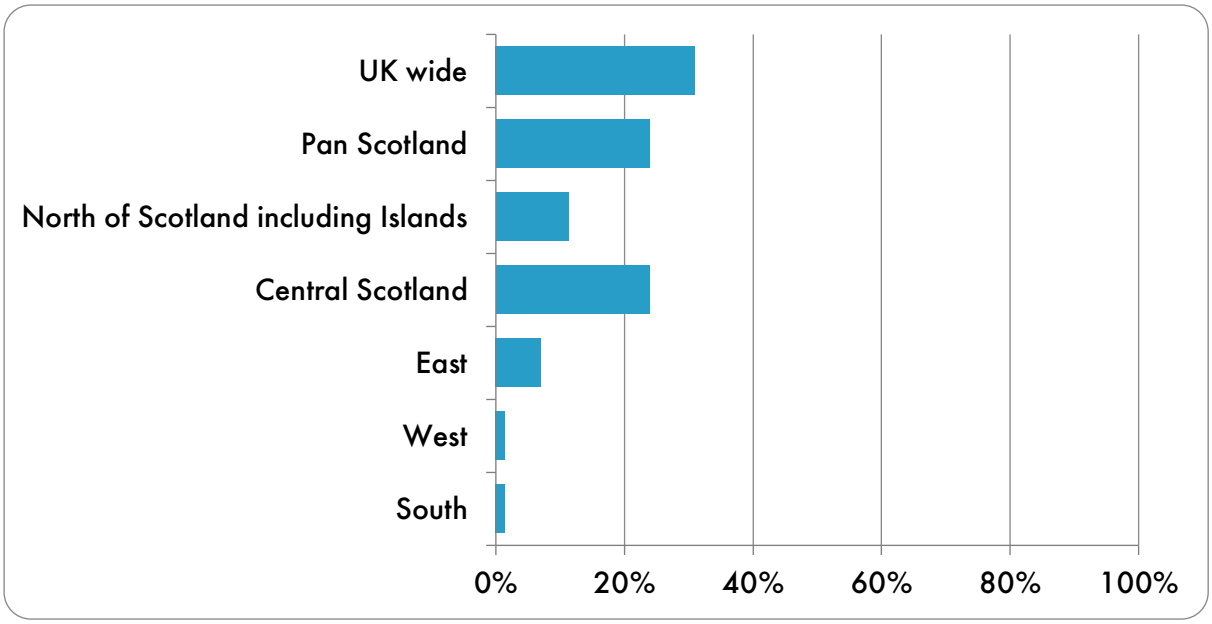


Figure 5 - Graph explaining survey results of respondent's predominant region of activity

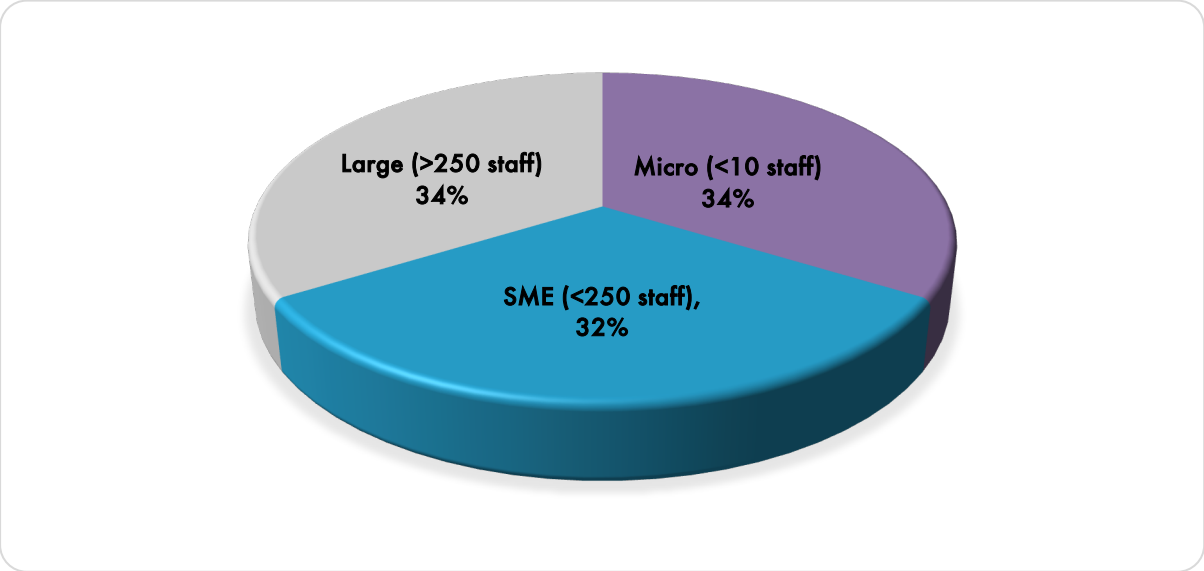


Figure 6 - Graph explaining survey results of respondent's organisation size

It was clear that the respondents thought that the reuse of building materials in Scotland is feasible (82%). However, only 46% currently use or specify reused materials, and only 25% of respondents currently supply reused materials or products for reuse. Most reused materials/products either specified, used or supplied vary considerably with no clear indication of key market opportunities other than to confirm that the current set up is ad hoc and not mainstream.

Respondents indicated clearly that the top materials they would consider reusing were timber, brick and steel if they were available in their region. A detailed breakdown is represented in Figure 7:

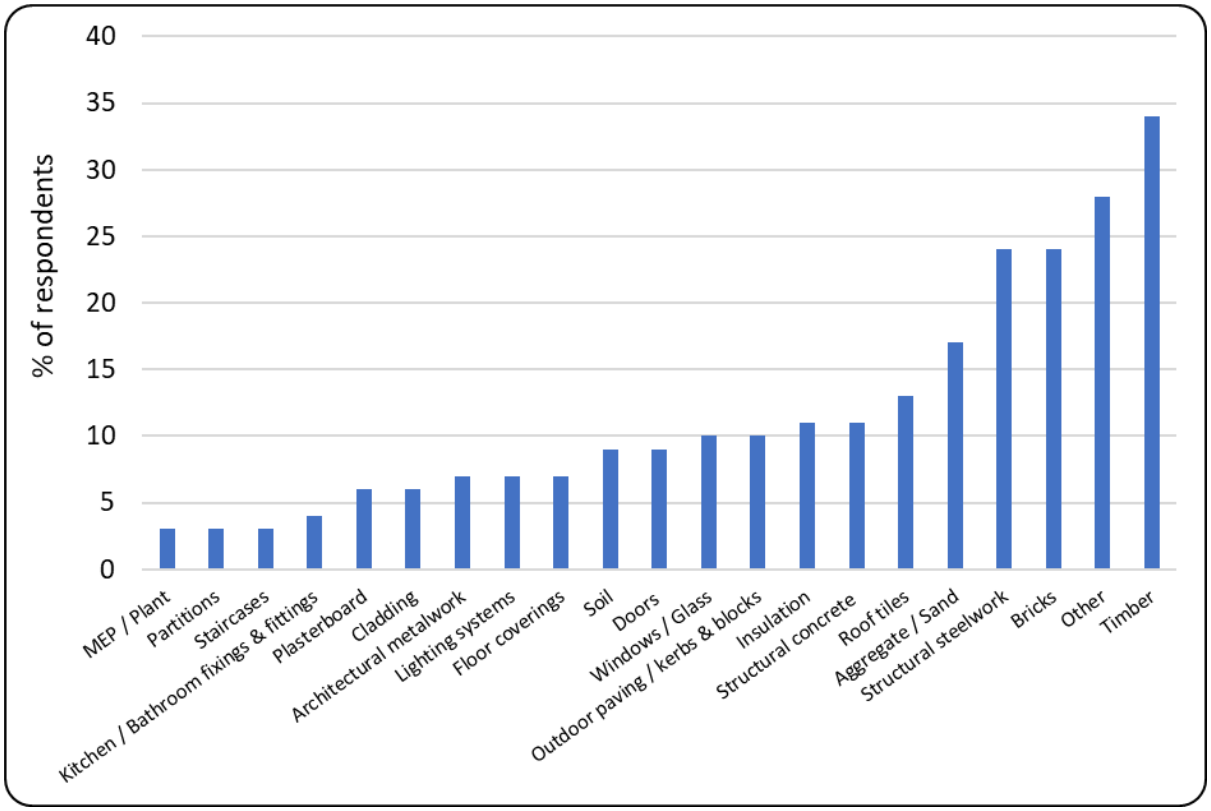


Figure 7 - Graph explaining survey results of reuse products/materials used by respondent's

The main driver for reusing products as indicated by the survey was 'Environmental' (see Figure 8). It is also encouraging to see that no respondents indicated there was no benefit to reuse.

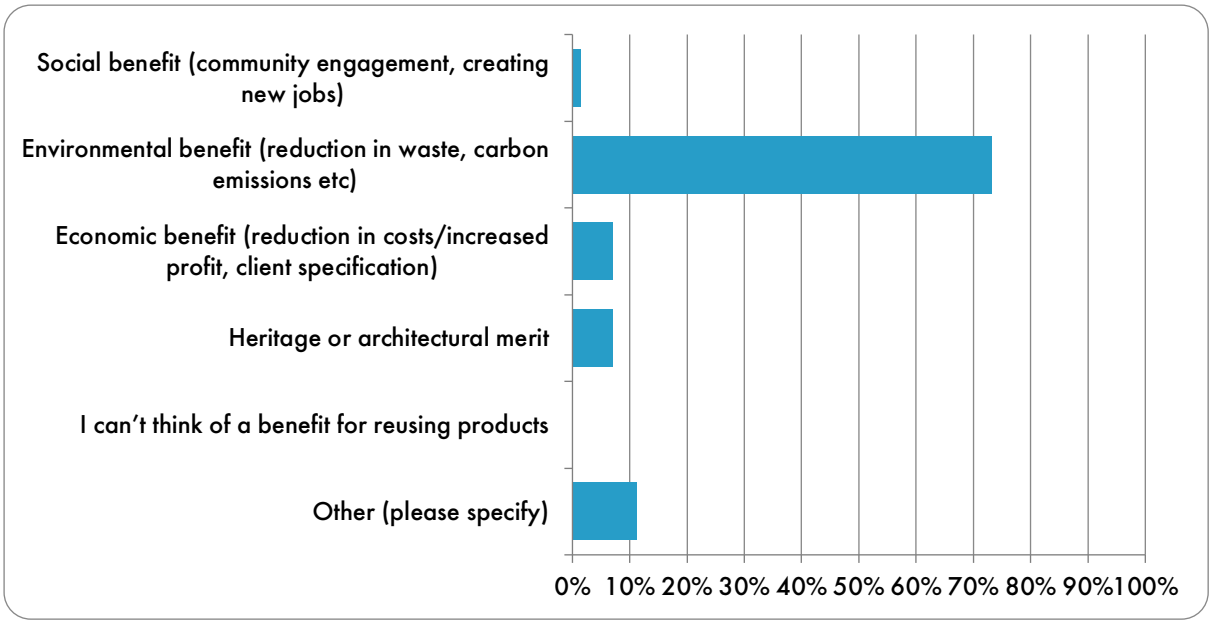


Figure 8 - Graph explaining survey results of respondent's main driver for reusing products

Figure 9 shows that the respondents indicated a range of blockers when considering reuse of construction materials, the top 5 highlighted are:

1. Insurance/warranty issues
2. Provenance/lack of information (e.g., product passports)
3. Lack of materials supply
4. Not knowing where to look for reused materials
5. Perception of inferior quality products.

From the authors' knowledge of circular economy implementation, these align with their experience. In the context of this discussion, if the infrastructure were put in place for more Reuse Hubs in Scotland (i.e., to enable supply), the other key issues which need to be tackled relate to data transparency and assurance (see Figure 9).

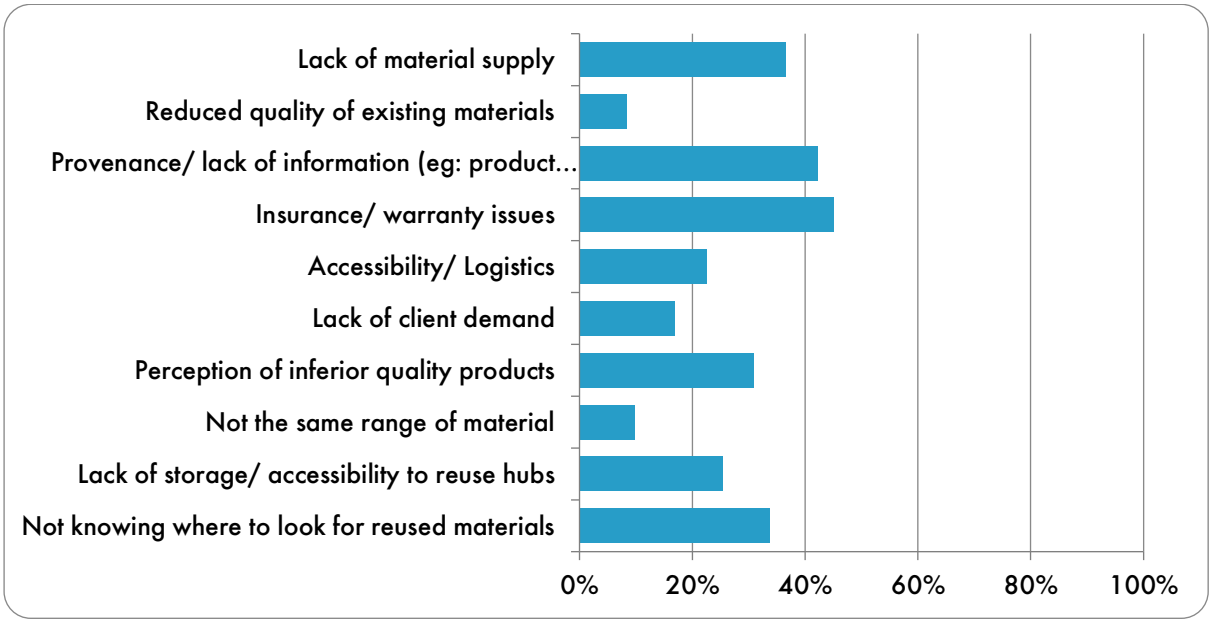


Figure 9 - Graph explaining survey results of respondent's main barriers to reuse

In terms of value, whilst economic drivers are not seen as the key driver for our respondents when it comes to reusing products, there is an expectation from 70% of answers that reused products should be cheaper than new (see Figure 10 below).

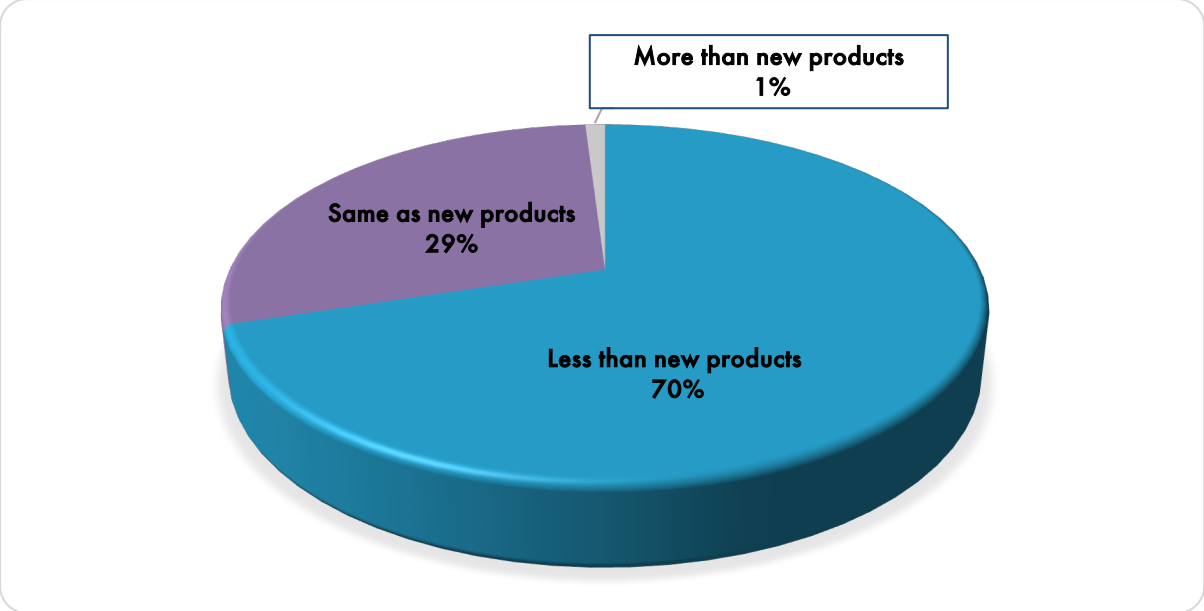


Figure 10 - Graph explaining survey results of respondent's expectations of reuse products

An overwhelming majority (90%) of respondents consider that reuse hubs need to have both physical (storage) and virtual/digital (platform) facilities. Just under 10% suggest that a physical hub is a good format.

Nearly a third of the respondents who filled in the survey would consider being part of a storage and/or sales solution to facilitate the reuse of products/materials. Promisingly, most respondents (86%) would consider using a reuse hub for their organisation.

5.2 Interview analysis

The analysis of the interviews was carried out per theme (set out in section 3.1.8) for each stakeholder group. The findings are shown in Tables 4, 5 and 6 below.

5.2.1 Opportunities

The following question was asked to the interviewees:

What are the biggest opportunities for reusing products?

- Resource efficiency
- Environmental
- Carbon mitigation
- Reduction in scope 3
- Innovation
- Financial
- Supply chain efficiencies and demands
- Reputation
- Heritage

Table 4 summary of the findings related to opportunities

Clients/ developers	Architects, designers, engineers	Manufacturers
• Need SEPA guidance on reused products – published in 2024 • Send to charities, e.g., schools or Low/ Middle Income countries - social value benefits • Carbon footprint is great opportunity (need to be balanced against travel mileage though) • Another driver is cost savings	• BREEAM, carbon (whole life cost) • Materials efficiency. • Need education (how to & explaining benefits to clients), raising awareness • Aesthetic is a driver for reuse	• Resource efficiency • Carbon reduction • Focus on specific products and specific markets (self-build, large construction or public sector)
Waste and resource management	**Contractors**	**Local authorities**
• waste reduction • resource extraction reduction • scope 3 emissions reduction • embodied carbon emissions reduction	• need to keep products for longer • drivers: financial and altruistic • costs savings	• ability to share best practices/ examples • opportunity for SMEs • planning is useful tool

In summary, most interviewees mentioned carbon reduction, waste reduction, social value benefits, resource efficiency, costs savings as the biggest opportunities.

5.2.2 Challenges

The following question was asked to the interviewees: What are the biggest challenges with reusing products?

The following table summarises their responses.

Table 5 Summary of the findings related to challenges

Clients/ developers	Architects, designers, engineers	Manufacturers

• Need to match supply and demand • Liability - who takes risks? • Logistics • Costs	• Certification and warranty are an issue • People like new shiny things • Consistent supply of materials • Most examples are ad hoc • No requirements to reuse - planning framework is a start but no targets • Need clear client brief • Industry geared towards recycling, not reuse • Lack of specification with reused materials • Who takes the risk/ responsibility for failure? • Lack of engagement of manufacturers • Some older products, e.g., fluorescent lightings, do not meet building regs and can therefore not be reused. • Cost: removal of some products (e.g., structural steel) is very expensive (need to build internal structure to support external structure) • Cost: client needs to drive agenda	• Definition of waste/end of waste • Lack of standards for reused products or products with recycled content • Need a good marketing approach • Hard to match supply/ demand • Aesthetic is a big perception issue with reuse • Physical space is important to enable people to see the products
Waste and resource management	**Contractors**	**Local authorities**
• Storage costs • Stock quality and availability • Extra care in transport needed to move from recycling to reuse	• Need to change expectation on visual aspect of reused products • Cost • Lack of market (supply and demand) • Lack of knowledge of platforms • Storage requires space and costs • Transport • Liability/ who takes the risks	• Perception reused products are of poorer quality • Need to change throw away culture • Need guide on "how to" - training? • Hard to source products

In summary, regarding the primary challenges, most interviewees mentioned:

- Issues of matching supply and demand – getting right quality and quantity
- Liability: who takes the risks
- Costs
- Certification/warranty and lack of standards for reused products
- Perception of low-quality products (aesthetic, performance)

5.2.3 Market demand

The following questions were asked to the interviewees:

Do you think that a reuse hub would be successful in Scotland? If yes, then would it be successful in your region?

This question was then expanded upon depending on the specific role the organisation had in the construction supply chain to advance circular economy. For example, some follow up questions were:

Clients/developers were also asked about their view on reused products:

- If positive, what are the positive outcomes, (e.g., costs saving, carbon, etc). Would they be willing to pay more to have reused products?
- If not interested, why (e.g., perception of being damaged/lesser quality, too risky, other)

Contractors were also asked their views on procurement of reused products in construction projects, i.e.:

- If you could source reused products, would you use them on new projects?
- If yes, which products would be of most interest? Would you be willing to pay the same price as for an equivalent new product?
- If no, why not? What are the barriers or challenges?

Architects, designers, engineers were also asked their views on designing with reused materials, i.e.:

- How often are you being asked to consider reusing products?
- What are the main drivers for reusing products?
- Do you suggest it as an approach to clients? What are their reactions?

Table 6 summary of the findings related to market demand

Clients/ developers	Architects, designers, engineers	Manufacturers
• Yes, reuse hub would be good • Volume might be an issue to meet commercial pressure • Need to build in targets in whole building	• Not 100% sure about reuse hubs • Online resource of reused products would be very helpful • Some market demand - depends on how well informed the client is - demand quite low in general • Nothing happening at scale • Sometimes sending to recycling is more economical (e.g., pipes and cables) • Since change in planning framework, there is more interest in reuse • Some architects push it to clients • Introduction of whole life cost in regulation would drive demand	• Yes, reuse hub would be good • Need financial/ carbon drivers • Some demand but need more • Marshalls (a manufacturer of construction products) have a close loop recycling process for rejects • Marshalls do not have take-back scheme for products, but they are working on a pallet take back scheme • Marshalls: surplus products redistributed within community
Waste and resource management	**Contractors**	**Local authorities**
• Yes, reuse hub would be good • Reuse hubs should be supported with regulatory/fiscal incentives	• Yes, reuse hub would be good • Most people would reuse products if available • Most people would pay same price, but some said clients would have to be on board	• Yes, reuse hub would be good • Need Government leadership • Sustainability needs to become part of winning bid

In general, there was a real positive response to reuse hubs in terms of market demand – apart from architects who were more cautious.

Most mentioned that

- The demand was growing but still small
- Competition between reuse and recycling (there could be regional differences depending on available facilities and logistics between urban and rural locations);
- Need to have volume to match demand
- Lack of awareness.

5.2.4 Location of hubs

The following questions were asked to the interviewees:

- Are you aware of existing hubs?
- Do you have any thoughts on where the reuse hubs should be located? e.g. in city centre, outskirts, max distance that could be travelled?
- Should they be existing facilities or new ones? If existing: do you have a view on what could be used?

In addition, Local Authorities were also asked: Would the council be able to support with providing a low rent option (for land) at least in the short to medium term?

Table 7 summary of the findings related to market demand

Clients/ developers	**Architects, designers, engineers**	**Manufacturers**
• Reuse hubs should operate on a regional basis • Some existing hubs for timber in Glasgow and Edinburgh	• Use existing infrastructure, e.g. Salvage yards • Aware of some hubs but in general limited awareness • Reuse hubs would help decision making process of architects and those dealing with specification as it would help better understanding of quality • Don't go and see new products, so if going to see reused ones, then hubs need to be easily accessible • Works in urban areas not rural. In urban areas: central hub is good • In general best make use of existing structure	• There was no agreement on distance including: out of town; not more than 50 miles away; between large cities; no more than 5 miles away • Use existing facilities - waste management companies • Use cheap/derelict land
Waste and resource management	**Contractors**	**Local authorities**
• need to have a country wide materials exchange aggregator • landfill tax could support hubs?	• little knowledge of existing hubs • use existing facility. • outskirt of city - 1 company mentions 40-50 miles radius would be good. other says 10-15 min travel max.	• local sites needed • as much as possible, use existing facilities, e.g., waste management, recycling, building merchant yards

	• probably need a few hubs to cover distances • happy to collaborate with other trades	• LA might be able to support development of hubs

In summary, although different distances were mentioned, there was generally a consensus for local access to reuse hubs; a need to make buying reused materials as easy as buying new; and a preference for some centralised repository of information; as well as a preference for utilisation of existing facilities in the first instance.

5.2.5 Business model of hubs

The following questions were asked to the interviewees:

- Should the hub be: physical, online, hybrid - why?
- What are the main drivers for reusing products? e.g., carbon reduction or cost savings?

In addition, Local Authorities were also asked:

- Would it be better to have a community-based model (which delivers social value in addition to environmental)) or a commercial model (which focuses more on environmental and commercial value)?

Table 8 summary of the findings related to business model of hubs

Clients/ developers	Architects, designers, engineers	Manufacturers
• Hybrid is best • Need to provide certification/ remanufacturing • Hubs need to be as close as possible to buying new products • Community based hub can be good as social enterprise • Some are willing to pay same or more to access reused products • Reuse needs to be normalised in same way as using new products • Use reverse logistics approach to work with existing systems	• Hybrid is best in urban areas: central hub is good • In rural areas: central hub needs to have digital platform (e.g., eBay) • Online hub needs to provide minimum info on product to provide some confidence product is suitable • Physical hub also good to check how testing is done and to check the product (but it takes time to go to hub) • A centralised pipeline of demolition work would be useful resource	• Hybrid is best hubs need to be connected - live inventory - order online • On an island, it is ok to have community base hub • Physical space important to enable people to see products

Waste and resource management	Contractors	Local authorities
• Hybrid is best-good to be able to "touch and feel" products • Commercial model for reuse hubs could work, but need subsidy to start off	• Hybrid is best, if products have value, then they are already being reused • Social enterprise has positives • Products from change of tenants would be good to consider • Both models of large and small scales would be good	• Hybrid is best, online can help sell more of smaller quantities and help buyer decide what they want • Physical hubs are good to store items (for use later) • Drivers for reuse: conservation/cheaper products • Both models have advantages: community can help engagement (better image). Commercial will help with volumes, more efficient in creating a market shift

More than 80% of interviewees agreed that a hybrid reuse hub model is best: online can provide minimum information to make initial decision and provide an overview of stock and availability; costs: some would be willing to pay same price as new. Interviewees also mentioned that being able to view the products before buying would be useful (although a barrier compared to new products) – need to build confidence that products are stored and tested properly.

Need to have community hubs in more rural areas and to support engagement with local communities. Larger commercial hubs would help provide volumes required by industry. The interviewers didn't expand on specific circular economy business models (i.e., service models, take back, leasing), although this may be useful to be explored in future studies.

5.2.6 Logistics

The following questions were asked to the interviewees:

- Do you think it is best if the reuse hub provides the transport or if it is arranged by the contractor? In particular in terms of costs?
- Depending on the region are there logistics issues that should be considered? e.g., size of a lorry, movement of wastes/products - if on more remote areas and/or if there is a ferry (for example).

Manufacturers were asked instead:

- Who do you think should pay for the costs of extracting and reclaiming the product (taking the product down) and then transporting it to your site?
- What are the packaging requirements that would provide you with more confidence that the product would not been damaged in transport?
- How is/could your product be identified on site?
- How would/do you promote your scheme?

Table 9 summary of the findings related to logistics

Clients/ developers	Architects, designers, engineers	Manufacturers
• Reused products need to meet standards/ testing requirements • Good to build on existing models/ structure	• Classification of reused products would be helpful • Need to have similar testing, information for reused products as for new. • Collection should be provided by hub, but there could be a fee	• Need to make sure products are packaged properly • Use QR codes • Product to be delivered to person - e.g., amazon model
Waste and resource management	**Contractors**	**Local authorities**
• Contractors need to pay for the transport • Need to prove concept of reuse hubs first	• Collection on site might be useful in other cases • Dropping off products is not an issue if company has a logistic arm • Collection/drop-off of products will vary depending on the value of the resale of the product • Important to have enough info on product to enable quick early decisions	• Depends on user (consumer versus contractors)

In summary, most people agreed that reused products need to be tested and classified in the same way as new products; there were different suggestions on who take charge of collection depending on trade; consensus that products need to be packaged properly.

5.2.7 Planning requirements

The following questions were asked to the interviewees:

- Do you have any requirements that would enable greater reuse of products? Either to create supply or to encourage demand?

In addition, Architects, designers and Engineers were also asked whether they foresee any planning issues in reusing products.

Table 10 summary of the findings related to planning requirements

Clients/ developers	Architects, designers, engineers	Manufacturers
• Planning requirements could drive change	• Potential issues with the consistency of implementation of regs. • Some planning officers not keen to apply changes to business as usual which could be a barrier. • Planning might be an issue as process is long in some cases, need to lock in design criteria early on • Planning not an issue for historic buildings • Current changes in planning could help, but costs still an issue	• Planning needs to enable recycling
Waste and resource management	**Contractors**	**Local authorities**
• No response provided	• Risks with some products needed to meet performance criteria • No issue with planning requirements mentioned	• Planning can be used to encourage reuse • Aberdeenshire used to have a store for reused products - they used to require that "people" salvage more products from demolition

5 interviewees indicated that current changes to the planning framework will help drive demand (this may be to facilitate reuse and recycling further); however, planning requirements could be reviewed to ensure they don't become a barrier.

5.2.8 Regulatory issues

The following questions were asked to the interviewees:

- Do you foresee any perceived or real regulatory issues (perhaps in relation to planning) with either extracting products to be reused or for reusing products?

Manufacturers were also asked their views on take back schemes.

Table 11 Summary of the findings related to regulatory issues

Architects, designers, engineers	Manufacturers	Waste and resource management
• No response provided	• Some manufacturers have a warranty scheme	• Definition of wastes needs to be clarified • Regulations could encourage take back- EPR?
Contractors	**Local authorities**	**Clients/ developers**
• Need to make sure the red tape for reusing products does not become a barrier • Perception is an issue • Need to clear the "waste" transfer aspect	• SEPA should be involved in monitoring of products • Depends on the materials	No response provided

Less than 5 respondents had a view on the regulatory issues, apart from a few respondents who gave views on the definition of waste, as reuse becomes more mainstream it is important to review any potential regulatory barriers to reuse.

5.2.9 Disparities between locations

The following questions were asked to the interviewees:

- Do you notice any difference in the practice in different regions?
- What is the biggest influencer in reusing products in different regions?
- What is the current practice in the region in which you operate?

Table 12 summary of the findings related to disparities between locations

Clients/ developers	Architects, designers, engineers	Waste and resource management
• In central and south, central hub is easy to access • Differences in different areas • Different availability of materials in different places • More demand in Glasgow, but important to make it work in other parts too	• Large cities like Glasgow and Edinburgh have more drive for sustainability than other regions • Logistics will be different in different regions	• No responses provided
Contractors	**Local authorities**	**Clients/ developers**
• Different products needed for different regions • Would work well in central belt • Some areas have more heritage requirements • Need to be clear what stock is available where to avoid unnecessary travel distance travelled might be the issue	• No responses provided	• No responses provided

In summary, different approaches to the business models of reuse hubs should be considered for different parts of Scotland. In more rural/remote areas, community-based hubs might be beneficial – could help with supply of materials, engagement with communities and resilience in the supply chain. In other parts of Scotland, a mix of commercial and community hubs could help with providing supplies to different communities. Also, the heritage community would benefit from more consistent supply of reused products for historic/listed buildings.

5.2.10 Products

The following questions were asked to the interviewees:

- What types of products are most likely to be extracted for reuse or reused in a new project in your region? i.e., are there specific architectural features typical of the region? Is there an obvious supply of specific materials?

In addition, contractors and client/developers were also asked:

- Which products do you currently identify for reuse? Is it from surplus ordering or post use? where do you "*send*" them? Would you be willing to install reused products in new projects?
- Waste and resource management, client/ developer, architect/ designer, manufacturer and contractor were also asked:
- Which products would be most suited for reuse: bricks, structural steelwork, structural concrete, timber (including mass timber), cladding (including curtain walling, rainscreen etc), architectural metalwork, staircases, doors, roof tiles, raised access flooring, floor coverings, partitions, lighting systems, suspended ceilings, mechanical, electrical, plumbing/plant, aggregate/sand/topsoil, windows/glass, insulation, plasterboard, outdoor paving, kerbs and blocks, kitchen/bathroom ware fixtures & fittings, other.

Waste and resource management were also asked:

- Which products do you see would be best reused? Do you have the facility to do so? What would be the £ benefits or drawbacks? (i.e., we know that they can make money from recycling products)

Manufacturers were asked:

- Which products do you take back? Or would you like to take back? Would you take back surplus materials, offcuts and/or products that have been previously installed in a building?

Architects/designers were also asked:

- Which products are you most likely to reuse? What affects your choice of using a reuse product? e.g., look, availability, impact on the need to redesign the space? Should reclaimed/reuse sit alongside the sale of new or bespoke materials to make it more viable?

Table 13 summary of the findings related to products

Clients/ developers	Architects, designers, engineers	Manufacturers
• Yes, would be happy to use reused products • Insulation, block, bricks, kitchen units, timber, plumbing, wiring, plants currently reused • Potential for products that cannot be seen (e.g., those	• Many products mentioned: • Steel (from oil rigs) • Some think everything could be reused • Shorter life span products are an issue,	• Take back: inert products (stone, concrete blocks) - already exist • Take-back of surplus already happens • Pallets, aggregates

hidden behind fixtures and fittings, dry lining) • If met same standard as new • Depending on product condition, could reuse timber, slates • Aggregates are biggest opportunity - big volume • Heritage materials are big opportunity for some	e.g., floor finish get damaged • Raised access flooring • Focus on items where aesthetics is not an issue as for example items hidden behind walls • Aesthetic is a driver for reuse – probably for historic buildings • Products for reuse = timber joists, structural steel • Items where disassembly not too hard, e.g., fixture and fittings • Surplus, offcuts not currently taken back, but could be • Excess materials (pre-consumer • Slates, stones, timber studs • Building services can be hard to reuse as some parts might need to be replaced/repaired • Focus on high value products	• Focus on specific materials and markets
Waste and resource management	**Contractors**	**Local authorities**
• Structural products such as brick, blocks, tiles • Potentially look at soft strip products • Need to consider the value of the land versus the benefits of setting up a hub – use of old landfills? • Rates need to reflect the activities	• Many products mentioned: • Surplus • Kitchen tops/units to match • Storm damaged/fence post • Brick, block • Timber • Stones • Aggregates • Finishes products, e.g., carpet, furniture • IT systems • Glass partitions: headset can get adjusted • Doors	• Mixed response. Unpopulated regions might be an issue (farmer tracks) • Windows seen as difficult • Best: products with architectural features

	• Items that can be stored outdoors are good • Products with no structural performance would be easier	

In summary, there is no consensus on any product for reuse. Many suggestions were made, for example some respondents saying that aesthetics is a barrier and others saying it is not, partially dependant on where the product is going to be used, e.g., commercial office versus historic building, or whether it would be visible or not to the users of the building. The response variation could also be linked to whether the interviewee is thinking about surplus ("new") products or post-consumer. The quantities required and ease of removal of certain products will also affect the choice of product for reuse.

5.2.11 Labour and skills

The following questions were asked to the interviewees:

What skills are missing for deconstruction, the packing and storage of products, renovating products (if manufacturers not involved), identifying products for reuse, pre-demolition/pre-refurb audit, other?

Local authorities were asked:

- Are you aware of repair centres in your area? Are there skills missing in your area?

Manufacturers were also asked:

- How much repair might be needed for the products to be reused? Would it be a service you could offer? Would you be willing to re-warranty the product?

Waste management companies were asked:

- Do you have skills to support reuse rather than recycling? e.g. repaint, repair, remanufacture etc?

Table 14 summary of the findings related to labour and skills

Clients/ developers	Architects, designers, engineers	Manufacturers
• Lack of skills to understand how to deconstruct instead of demolishing • Big opportunity for jobs - urban mining	• Willingness to spend more time to explore how to reuse is needed • Attitude and cultural shift needed as well as skills • Lack of awareness that reuse can be done and how • Repair skills needed	• Some skills missing, but biggest issue is culture of wanting new • Some manufacturers could offer repair and testing, but worried it would be hard to get product certified
Waste and resource management	**Contractors**	**Local authorities**
• Skills required to reprocess	• Need better understanding of time to deconstruct versus demolish • Need to ensure that finding a second-hand part is not going to take more time than a new product • Skill sets are there • Need awareness of circular economy • Need incentives (e.g. Vat free)	• There are skills missing: no courses at university on green skills; need more skills on some "*older*" materials

In general, the interviewees felt that there was a need to educate industry on deconstruction versus demolition; raise awareness of reuse and benefits of reuse; change mindset that new is always better; increase capacity in skills needed to repair/reprocess products; heritage sector might be able to help with upskilling.

5.2.12 Dealing with supply

The following questions were asked to the interviewees:

Would it be better to have a community-based model (ESG credits/delivering social value as well as environmental) which you would likely only supply (in smaller quantities) to or a commercial model which you could supply into and purchase from? Or both?

Contractors were also asked:

- Do you carry out pre-demolition/pre-refurbishment audits prior to demolition/strip out of buildings?
- Do you identify products for reuse and try to take them out of buildings to enable a second life?

Architects, designers and engineers were asked:

- Are you ever being asked to design a space with reused products?
- What aspects might you need to consider?
- How do you persuade a client to reuse products?
- What value does reusing products bring to a project? e.g. historical, money saving, environmental benefits

Table 15 summary of the findings related to dealing with supply

Clients/ developers	**Architects, designers, engineers**	**Manufacturers**
• Need to match supply and demand • Commercial model is mentioned by two and community by one – both models of interest	No response provided	• Need to make it easy for consumers • Need to make business case to show reduction in embodied carbon and reduction in wastes
Contractors	**Local authorities**	**Waste and resource management**
• Engage with building merchants • Encourage social value aspects • Encourage people to keep spares to enable repair • Encourage pre-demolition audits • ESG can help drive reuse • Tax benefits required End of line products	• Both models have advantages: community can help engagement (better image). Commercial will help with volumes, more efficient in creating a market shift	• Not applicable

In general, the reuse of products was considered to create social and environmental benefits; there is a need to collaborate across the supply chain and to make it easy for consumers.

5.3 Workshop analysis

5.3.1 Exercise 1: Which products are more suited for reuse

During Exercise 1 of the workshops the attendees were asked:

Taking the products that were identified in the survey and interviews, classify them as easy/ hard to reuse and give an estimate on likely demand (high/low)

Overall, there was agreement for some of the products listed, such as:

- Timber, structural steel work, insulation and bricks are considered high demand
- Aggregates are considered high demand and easy to reuse
- Outdoor paving and doors: easy to reuse but medium demand
- Raised access floor: medium demand
- Lighting system: low to medium demand and medium ease of reuse
- Partitions and staircases are seen to be medium demand and quite hard to reuse
- Mechanical, electrical and plumbing (mep) plant is considered to be low demand with varying levels of ease of reuse

There were also varied responses for different products. The respondent provided different responses depending on how they considered the condition (quality) of the products and their value retention. Their responses also varied depending on whether the products might be post-consumer versus pre-consumption (i.e., surplus). The products concerned included:

- Kitchen and sanitary
- Plasterboard
- Floor covering
- Kerbs and blocks
- Windows and glass
- Cladding
- Suspended ceiling
- Structural concrete
- Roof tiles
- Architectural metal work
- Non-structural steel

In general, there is little consensus on which products the reuse hubs should focus on, which is probably a reflection on the level of experience and expertise from the participants. It is also a reflection on the perception of quality of the products depending on where they are sourced (i.e., post- versus pre-consumption).

5.3.2 Exercise 2: What needs to happen to enable the creation of reuse hubs

Exercise 2 involved asking the attendees: what needs to happen to enable the creation of successful reuse hubs?

The results of the workshops are summarised in Tables 16 to 25 below. The attendees' comments have been grouped by 'general points', points related to 'community hubs', and points related to 'commercial hubs'. The findings of the two workshops (for rural or urban context) have been grouped into one set of tables.

5.3.2.1 Regulation / planning / contract

Table 16 Exercise 2 – findings in relation to regulation/planning/contract

	Comments
General points	• Notification system that links with a planning portal to notify potential traditional buildings of available materials • Making it a requirement to have a % of buildings from re-used materials. • Need to collaborate and link various hubs • Need clear policy steer from central government • Review of pas2035 for potential conflicts with reuse • Need financial incentives - such as the energy efficient Scotland: area-based schemes for energy efficiency
Community hub	• Community level model can support engagement with local communities and waste management contractors • Heritage sector interested in community level hub
Commercial hub	• Inspection of incoming materials to ensure compliance with current standards • Mandate the creation of temporary hubs on sites • If commercial hub created, then could include reuse requirements in contracts with contractors • Match supply and demand

5.3.2.2 Location

Table 17 Exercise 2 – findings in relation to location

	Comments
General points	• Need to ensure they are not too far from point of use • Regional hubs preferred • Transport is important - need to consider who pays for what
Community hub	• Plenty of space available in rural • Could be located near larger towns to serve local communities • Community hubs seen as huge opportunity for rural areas
Commercial hub	• Use existing infrastructure • Need access for large vehicles

5.3.2.3 Importance of data and communication/ engagement

Table 18 Exercise 2 – findings in relation to importance of data and communication/ engagement

	Comments
General points	• Collaboration/ sharing is key • Collate products from demolition and construction sites (surplus) • Connected reuse hubs • Inventory of resources
Community hub	• No comment provided
Commercial hub	• No comment provided

5.3.2.4 Skills

Table 19 Exercise 2 – findings in relation to skills

	Comments
General points	• Need financial support to transfer knowledge from existing hubs to other locations • Reuse hubs seen as opportunity to create jobs to run hubs • Use skills from conservation sector for identification, specification of reused products • Certification programmes for smes and sole practitioners • Can link with apprenticeships and training programmes using community benefits (Build Your Future Scotland, Developing the Young Workforce, etc) • Awareness raising - embed reuse at design stage • Skills needed to understand level of damage, identification, condition, deconstruction
Community hub	• No comment provided
Commercial hub	• Skills required for testing and repairing products in commercial hubs

5.3.2.5 Role of platforms/digital reuse hubs

Table 20 Exercise 2 – findings in relation to role of platforms/digital reuse hubs

	Comments
General points	• Digital platform key to register basic info on products, such as quantities, conditions, location • Need to have umbrella organisation to keep track of stocks from various hubs

	• Digital platform key to support physical hub • Digital passports • Create an inventory of supply
Community hub	• No comment provided
Commercial hub	• No comment provided

5.3.2.6 Role of physical reuse hubs

Table 21 Exercise 2 – findings in relation to role of physical reuse hubs

	Comments
General points	• Need regional hubs to reduce transport distances: costs and impact • Physical hub will help with awareness raising, education and training
Community hub	• No comment provided
Commercial hub	• Physical hub will give confidence of condition of product, quality and quantities • Physical hub will provide opportunity to see any process required to repair product

5.3.2.7 Warranty

Table 22 Exercise 2 – findings in relation to warranty

	Comments
General points	• Need to increase testing/ certification of reused products to provide quality assurance • Disclaimer needed • Note that traditional materials don't always come with guarantees, but that doesn't negate their value or quality – skills/craftsmen
Community hub	• No comment provided
Commercial hub	• No comment provided

5.3.2.8 Economic benefits

Table 23 Exercise 2 – findings in relation to economic benefits

	Comments
General points	• Products at lower costs • Needed to create demand - raise awareness • Needed to be able to deliver at scale
Community hub	• Creating a market for reused products can help provide stock of materials and therefore keep costs down
Commercial hub	• Some large companies already have system in place to share resources across sites

5.3.2.9 Environmental and social benefits

Table 24 Exercise 2 – findings in relation to environmental and social benefits

	Comments
General points	• Need to clearly make link between reuse and net zero agenda
Community hub	• Need both commercial and community hubs in rural areas - attract business • Need life cycle assessment (lca) data on reused products
Commercial hub	• Chain of custody of products (from 1st to 2nd life) • Environmental product declaration (epd)

5.3.2.10 Other

Table 25 Exercise 2 – findings in relation to other issues

	Comments
General points	• Funding required to further test the concept of reuse hubs
Community hub	• Seed funding to kick start a community hub • Funding for feasibility study on set up of community hub • Urban mining
Commercial hub	• No comment provided

6 Recommendations

Based on the results of the desk-based study, the survey, the interviews and the workshops, the authors can make a set of clear recommendations:

Existing Hubs - There are several existing hubs that have already been established in the UK and Scotland, but the level of awareness is low. There should be a trusted mechanism to connect and better promote these organisations.

Business Models - There was a clear agreement from the research that a hybrid hub model was better than having only a physical or digital reuse hub – see section 5.2.5. Having the combined benefits of a physical and digital hub would be the ideal solution for long term viability, particularly for the commercial model.

- The physical facility can provide confidence in the quality of the products and testing regime that it has undergone
- The digital platform can provide enough initial information for someone to decide as to whether to buy and/or go and see the product

Community vs Commercial - There was consensus that a mixture of community-based hubs and commercial hubs would be beneficial to address both the diverse needs and the differing context of who the Hub would serve and where a commercial and community hub would be best located.

- Community based hubs might service smaller trades, DIY or charities; they can help with engaging with local communities; they can be particularly useful in more remote areas where there are issues with procuring (new) products
- Commercial hubs can deal with larger volumes and cater for larger construction projects, but products would need to have some type of warranty/testing to comply with legislative requirements.

The authors envisage that commercial reuse hubs could pass on excess stock or smaller quantities of stock to community-based reuse hubs where relevant (as a community benefit).

Rural and Urban areas – There are differences between rural and urban area requirements, which are also linked to the community vs commercial options in terms of users/ catchment:

- In rural areas, land is potentially less constrained than in urban areas, and the hubs could help create jobs. However, they would need to be easily accessible. An overarching digital platform to connect the various hubs would be useful.
- In urban areas, the volumes of products required might be larger and it is important that the supply meets the demand.
- Overall, hubs need to serve a local area. There was no agreement on how far users of the hubs would be willing to travel.

Whilst it was not discussed in the stakeholder engagement, it can be assumed that rural and urban reuse hubs could be connected via digital reuse hubs (platforms).

Funding - Some initial funding to create pilot projects is needed and to prove the concept for wider scaling up across different Scottish regions.

Skills - There were mixed comments around whether the industry has the right skills - participants mentioned knowledge transfer from other parts of the sector (e.g. heritage) required for a construction reuse hub. Upskilling and retraining for reuse should be integrated with a programme to increase 'green' skills overall.

Market demand - More drivers need to be created to stimulate demand. For example, setting targets for reuse products in the National Planning Framework or to align with a whole life carbon approach (the link between reused products and the net zero agenda needs to be made clearer).

Supply and Demand - From a product supply and demand perspective there was no agreement on the products that the hubs should focus on first. Various sources of products were identified: from construction sites (off cuts, surplus materials – pre-consumer, "new" products), from manufacturers or builder's merchants (end of line products), and from strip out/demolition sites (post-consumer products). There was also no agreement on the exact location of the hubs, but most people mentioned that they should not be too far from the point of use and that they should be notified digitally so a user can get an idea of what is available and where.

Based on the areas of consensus outlined above, a series of outcomes and recommendations have been produced to increase supply and demand of reused materials and as such improve the feasibility of establishing successful regional materials reuse hubs in Scotland. This includes consideration of how delivering on these recommendations could have a positive economic, environmental, and/or social impact (as defined in general terms for each of the themes identified) – see table 26 below.

Table 26 Outcomes and recommendations to improve the feasibility of establishing successful regional reuse hubs in Scotland

Themes	Expected outcomes	Economic impact	Environmental impact	Social impact	Author recommendations (based on both findings and analysis and their experience in the sector)
Opportunities / challenges	Increased awareness of Scotland's circular economy ambitions and UKs Net Zero targets	Yes	Yes		Government support required to increase visibility and knowledge base around reuse and circular economy through wider communication, workshops, business support and local authorities (subjects to include circular economy, whole life carbon, business model innovation etc) The link between carbon reduction and circular economy solutions (including reuse) needs to be made clearer and more evident.
	Increase access to materials already in circulation for future construction developments/ commercial use	Yes	Yes		Incentivisation schemes/ seed funding should support existing depots to buy/ sell reused products, manufacturers to offer take-back schemes, and to help to scale up supply/ demand through existing infrastructure
	Increase buy-in from those less aware of reuse as a concept, or existing reuse hubs. Provision of simple, easy to digest best practice guidance	Yes	Yes	Yes	Guidance and case studies to promote the business case for reuse and existing reuse infrastructure

Themes	Expected outcomes	Economic impact	Environmental impact	Social impact	Author recommendations (based on both findings and analysis and their experience in the sector)
Market demand	Stimulate demand to encourage use of existing products (those already in circulation) over new	Yes	Yes	Yes	Pilot projects to overcome the barriers and perceptions around reuse over new, i.e. warranties, testing, storage, logistics
	Stimulate demand to encourage use of existing products over new		Yes		Introduction of circular economy targets/ metrics for large developments and make the benefits this brings in relation to National Planning Framework targets around whole life carbon clearer
Location of hubs	Need both urban and rural hubs to be aware of types and location of materials available as well as demand demographics to make good location choices	Yes	Yes	Yes	Practical exercises to be carried out in specific regions to record material flows to support local developments, leading to business case developments for specific sites
	Scaling up of use of existing materials	Yes	Yes	Yes	Pilot projects to be identified and funded through innovation grants/ seed funding
Logistics	Ensure physical hubs are easy to access and connected to local infrastructure	Yes	Yes	Yes	Practical exercises to be carried out in specific regions to record material flows to support local developments, leading to business case developments for specific sites – specific consideration around transport and logistics and who is responsible

Themes	Expected outcomes	Economic impact	Environmental impact	Social impact	Author recommendations (based on both findings and analysis and their experience in the sector)
Business model of hubs	Increase community-led small-scale hubs in rural locations	Yes	Yes	Yes	Government seed funding and mechanisms (e.g. green bonds) to be set up in line with Scottish 2030 circular and waste targets
	Increase supply and take back of existing materials for construction developments/ commercial use	Yes	Yes		Incentivisation schemes/ seed funding should support existing depots to buy/ sell reused products and to help to scale up supply/ demand through existing infrastructure
	Increase supply and demand of existing materials for construction developments/ commercial use	Yes	Yes		Consumers should be incentivised to buy existing over the use of raw materials, e.g. 0% VAT
	Better use of existing infrastructure to support salvage of materials	Yes	Yes	Yes	Existing businesses (trade and salvage) should be encouraged to expand their offering
	Better use of existing infrastructure to support salvage of materials	Yes	Yes	Yes	Investigation of policy and/ or fiscal measures to encourage manufacturers and suppliers to take back and remanufacture for product life extension.
	Increase number of physical and virtual hubs in Scotland to facilitate supply and demand	Yes	Yes	Yes	Physical sites should be encouraged to advertise their donor, and recipient needs on a virtual platform to increase visibility and to deal with supply and demand

Themes	Expected outcomes	Economic impact	Environmental impact	Social impact	Author recommendations (based on both findings and analysis and their experience in the sector)
	Increase number of physical and virtual hubs in Scotland to facilitate supply and demand	Yes	Yes	Yes	Investigate options for how best to support the setting up of a national 'aggregator' platform to signpost to physical hubs and encourage reuse of existing materials, for example ReLondon's Material Reuse Portal
Planning requirements	Increase number of physical and virtual hubs in Scotland to facilitate supply and demand	Yes	Yes	Yes	Local authorities to promote use of virtual platforms, e.g. for large developments to demonstrate commitment to use reused products.
	Increase supply and take back of existing materials for construction developments/ commercial use	Yes	Yes		It could be included in the planning requirements that a certain amount of material must be reclaimed from buildings that are partially or fully demolished. Incentivisation schemes/ seed funding should support existing depots to buy/ sell reused products and to help to scale up supply/ demand through existing infrastructure
	Stimulated demand to encourage use of existing products over new	Yes	Yes	Yes	Set planning targets to have a % of new developments from re-used materials, or for existing buildings to be retained (% reuse). A target for whole life carbon would also be a lever for the retention and reuse of existing materials/ products.

Themes	Expected outcomes	Economic impact	Environmental impact	Social impact	Author recommendations (based on both findings and analysis and their experience in the sector)
Regulatory issues	Increase confidence of using existing products/ materials over new		Yes		Produce guidance (and signpost to existing standards) for testing and recertification of key products/ materials for reuse for commonly used applications
	Increase awareness of waste regulations		Yes		Training, education and guidance to be provided
	Increase supply and take back of existing materials for construction developments/ commercial use	Yes	Yes	Yes	Review opportunities/ mechanisms for introducing obligations for building material manufacturers (like Right to Repair).
Products	Increase standardisation and transparency of existing products/ materials for greater product assurance		Yes		Evaluate the feasibility of adoption of standardised Digital Product Passport, Ref. WBCSD report
Labour and skills	Increase number of physical and virtual hubs in Scotland to facilitate supply and demand	Yes	Yes	Yes	Review current skills across different regions and identify key opportunities to fill gaps to coincide with anticipated supply/ demand for key trades. There is an opportunity for schools and education authorities to get involved.
	Increase standardisation and transparency of existing			Yes	Use skills from conservation sector for identification, specification of reused products

Themes	Expected outcomes	Economic impact	Environmental impact	Social impact	Author recommendations (based on both findings and analysis and their experience in the sector)
	products/ materials for greater product assurance				
Dealing with supply	Improve and consolidate the market for reused products - can help provide stock of materials and therefore keep costs down	Yes	Yes	Yes	Incentivise/ increase requirements (e.g. through planning) to encourage greater supply of existing products/ materials which are already here, e.g.: • Circularity targets • Pre-Redevelopment audits • Pre-demolition audits • Targets to reduce embodied carbon

The authors consider that whilst a reuse marketplace already exists for household goods and some high value construction and heritage products and materials currently, for Scotland to reduce its reliance on using virgin materials, significant measures need to be actively taken to keep existing materials in circulation.

There is considerable appetite from the industry to move forward and pilot circular economy activities, for example, our project team have experience in developing reuse pilot studies (e.g., The FIS Reuse Initiative), Physical Reuse sites (e.g., The Reuse Hub in Wolverhampton and The Rebuild Site in Carlisle), and roll out of a UK Materials Exchange Platform (e.g., Excess Materials Exchange). All these initiatives have required seed funding (from either public or private sector) to get established and as importantly for the capital expenditure required to scale.

The consolidation and expansion of a reuse network is key for the reuse of products to move from ad hoc to business as usual, as such the authors would recommend next steps to include the piloting of several reuse hubs, with a particular focus on urban locations and dealing with mainstream construction and demolition materials.

6.1 Final remarks

This study was commissioned to explore the feasibility of regional reuse hubs in Scotland. It has achieved this by doing desk-based research, engaging with 116 stakeholders to gain feedback from key industry groups in different geographical regions in Scotland and analysing the data collated. Recommendations have also been informed by the reuse experience of the authors.

In addition to a growing momentum around the circular economy across the wider UK, initiatives such as the Circular Economy and Waste Route Map to 2030: consultation' paper and National Planning Framework 4 are putting more focus on whole life carbon and circularity in Scotland. This is bringing with it demand to get the reuse of materials into the mainstream.

Existing marketplaces are in operation currently across Scotland, although many established reclamation and reuse dealers focus on heritage or 'rustic' materials destined for the domestic market. Few are geared towards selling what comes out of large commercial buildings which historically, and still, makes up the bulk of demolition waste in urban areas and cities.

There was no consensus regarding materials most in demand. However, from an incentive or supply chain focus perspective, the authors recommend priority could be given to the products and materials with the highest carbon footprint and/ or biggest volumes i.e., what would make the biggest impact in terms of carbon and waste reduction. This would include concrete, aluminium, steel and glass.

The authors recommend that next steps should prioritise pilot projects which would need to focus on testing financial levers and exploring storage solutions and warranty options to reduce potential barriers for reuse, and to accommodate this within the existing infrastructure (e.g. manufacturers, distributors, wholesale, waste management and salvage companies). For example, could construction logistics hubs (sometimes called consolidation hubs) diversify and take surplus or reclaimed materials on the backhaul to either act as a storage hub to provide more time for the material to move between donor and a recipient, redistribute the materials

to reuse hubs or even become a reuse hub in addition to a new material logistics hub and assess, process and resell the surplus/reclaimed materials themselves?

Reuse is still quite niche in the construction sector as such there is limited awareness and information about reuse and reuse hubs/ infrastructure. There is still a long way to go regarding the behaviour change and knowledge required; there are issues around the availability and cost of logistics and storage; and the risks associated with reusing products (particularly a risk perceived by contractors) such as not having the right products in the right quantities at the right time – and at an accepted quality/with a warranty.

Reuse hubs will reduce waste from construction and demolition activities and enable the exchange of materials for higher value uses, as well as share and incentivise circular design and processes, supporting the flow of (re)usable (both new products from surplus delivery to site and post-consumer products) products within the built environment. Based on their experience of reusing products in construction and from discussions with existing reuse hubs, the authors believe that in the longer-term reuse hubs could also support knowledge exchange, skills transfer and community resilience. The reuse hubs could be run by the third, public or private sector and be at a community or a commercial level. In practice, a blended approach is likely to deliver long-term operational sustainability and maximum impact across the triple bottom line.

Like anything new - though in reality reuse has been happening for centuries just not so much in this century - it takes practice (tried and tested solutions) and scale (operations of a size to give reassurance, and economies of scale) to create a more effective and efficient process and infrastructure.

As more organisations move into the construction materials reuse space, the industry will get closer to creating the tipping point between something that is currently quite niche to an activity that is a mainstream part of the design, build, deconstruction and reclamation process.

7 Authors' Biographies

7.1 Nitesh Magdani

Nitesh Magdani is the founder of Net Positive Solutions and has over 25 years of experience working across the areas of design, construction and property development, as a Chartered Architect and sustainability leader. Net Positive Solutions are currently the circular economy consultant for the London Borough of Enfield's Meridian Water mixed use development in London – this includes facilitating reuse of materials (across a £6bn multi phased regeneration scheme) between donors and recipients.

Activities include extensive stakeholder engagement; facilitation of building surveys (Pre-demolition Audits); input into tender processes to embed circular outcomes into demolition contracts; adoption of circular economy indicators; and setting up testing criteria/adherence to Quality Protocols for secondary materials to move from one project to another. As part of this engagement, Nitesh initiated the UKs first council wide Digital Materials Platform for Enfield to help leverage supply and demand of material reuse between projects. This platform has worked successfully alongside the design, construction and demolition of Meridian Water's changing landscape, alongside a bank of salvaged materials for onward reuse. Today, Nitesh is also Head of UK for Excess Materials Exchange which is now expanding across the UK.

7.2 Flavie Lowres

Dr Flavie Lowres has a PhD in Metallurgy and Materials, Science and Engineering from the University of Birmingham. After 18 years at BRE, where she specialised in embodied carbon, life cycle assessment and circular economy, she set up her own company in 2021. From Green Thinking Ltd, she advised clients on EPD, embodied carbon and circular economy strategies.

She also works for the FIS (Finishes and Interior Sector) as their Sustainability Champion. As part of the FIS, she is piloting a storage facility to enable the large-scale reuse of suspended metal ceiling tiles and luminaires in commercial offices. In addition, she works for ASBP (Alliance for Sustainable Building Products) as their embodied carbon expert, and she chairs the Construction Materials Group for IOM3 (Institute of Materials, Minerals and Mining).

As part of her various roles, Flavie aims to understand the needs of the industry and to work with them to understand how to meet them in a practical way. She challenges the status quo of the take make dispose approach to find means to better optimise the chance of reuse of products. Through her role as a sustainability champion for the FIS, Flavie is also currently leading an initiative to create a pilot project for a storage space in London to demonstrate the supply and demand of suspended metal ceiling tiles and luminaires.

7.3 Jennifer Smart

Jennifer has 25 years construction and built environment industry experience in a variety of roles including business development, employee and stakeholder engagement, and communications.

A qualified Civil and Environmental engineer with considerable experience in project and programme management, Jennifer is a skilled communicator and established leader within Scotland's sustainability and built environment landscape and is highly experienced in multi-strand engagement programmes, exploiting project milestones to deliver impactful outcomes. She has also developed an extensive network within the built environment supply chain, including contractors, suppliers, and public sector stakeholders.

BE-ST regularly contributes to innovation and sustainability impact for Scotland and regularly undertake work to promote policy development for Scottish Enterprise, Zero Waste Scotland, Scottish government as well as regional and local authorities.

7.4 Debbie Ward

Debbie has over 20 years' experience in the construction industry. Increasing involvement with the circular economy agenda over several years, both through work, studying the Innovation, Enterprise & Circular Economy PGCert and being co-organiser of the local Circular Economy Club chapter, resulted in Debbie establishing Cirklo Consult to focus on circular economy related training and support including Carbon Literacy & Circular Economy courses, clients include the University of Exeter, University of Wolverhampton, Innovate UK, Carlisle College and the University College Birmingham.

She is an IEMA Associate and sits on the IEMA Circular Economy Steering Group, and she was a member of the working group that delivered the UKGBC Systems Enablers for a Circular Economy report. Debbie currently works part time with The Alliance for Sustainable Building Products as a Reuse & Circular Economy Associate leading on the Reuse Now campaign. This involves working with a cross section of the construction industry to better understand the challenges, barriers, and opportunities associated with the reuse of products and materials and create a variety of outputs to support the sector to find solutions and drive change.

Debbie's keen interest in circular economy in construction led to her becoming a Director of The Rebuild Site CIC in 2021. Rebuild takes surplus materials from construction sites and builders merchants diverting them from landfill to be reused or repurposed. Rebuild has grown to incorporate a Community RePaint and Tool Library offer in addition to doubling the store footprint, and the team are now looking to expand with a second site in Cumbria and into the West Midlands in partnership with a local social enterprise.

8 Appendices

8.1 Leading examples of existing physical and virtual platforms

This section provides several case studies on existing reuse hubs in Scotland, the UK and abroad. Examples have been selected from several well-known examples, those signposted to the authors, and others which came up in internet searches. It highlights the gap in the market for mainstream construction material reuse.

8.1.1 Case studies: Leading examples in Scotland

From small salvage companies steeped in history to more recently community reuse hubs there are many existing examples of organisations dealing with the reclamation and/or repair and reuse of products and materials in Scotland. They are diverse in their geography, structure, reach and items stocked and many are not well known outside of their immediate community. All the examples found and documented below are predominantly focused on furniture, fixtures and fittings or recycling (i.e. down cycling) – a few community based organisations provide a wide array of furniture and also ad hoc construction materials, but not in sufficient quantities to support the construction industry.

8.1.1.1 Stirling Reuse Hub

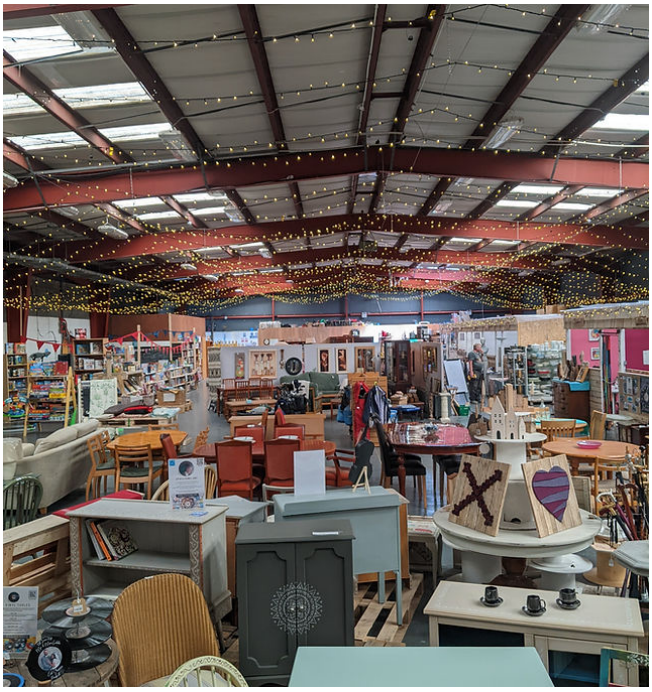


Figure 4 Stirling Reuse Hub's warehouse facility (photo credit: https://www.stirlingreusehub.org.uk/)

Transition Stirling is an environmental charity, based in Stirling, which aims to provide a positive response to and secure our community's future from the effects of climate change, through advancing citizenship, raising awareness and encouraging action.

Current projects include a Tool Library that offers their community the opportunity to borrow tools, an events schedule that allows skills to be shared; an IT project that refurbishes and re-homes unused phones, tablets and laptops; the Wood Reuse project was established to give volunteers the opportunity to learn skills to make new items with waste wood; and Stirling Reuse Hub which focusses on providing sustainable and refurbished products to the people of Stirling.

The Reuse Hub and Reclaimers have some fabulous makers working in the Makerspace. They each bring their own style and creative skill to upcycling and repurposing. The Reuse Hub's passionate team works to help the community reuse items and improve the circular economy.

In the two years since opening the organisation has grown from approximately 5 - 25 staff, and turnover across the charity is approximately £500,000. However, they are in a period of great uncertainty with a changing funding landscape, increasing energy costs and a cost-of-living crisis. The hope is that the organisation continues to thrive, they have a diversified income and are expected to grow with plans to open a city centre store which could enable the out-of-town space to deal with different stock and activities, such as construction materials. The Circular Economy Bill is viewed as potentially driving several opportunities in the future.

Target Market: Local communities

Sources of income: Approximately 40% direct sales, 30% employability grants to support people furthest from the workforce, 30% research and collaborative projects e.g. to carry out feasibility studies and other activities.

8.1.1.2 Wood RecyclAbility in Ellon

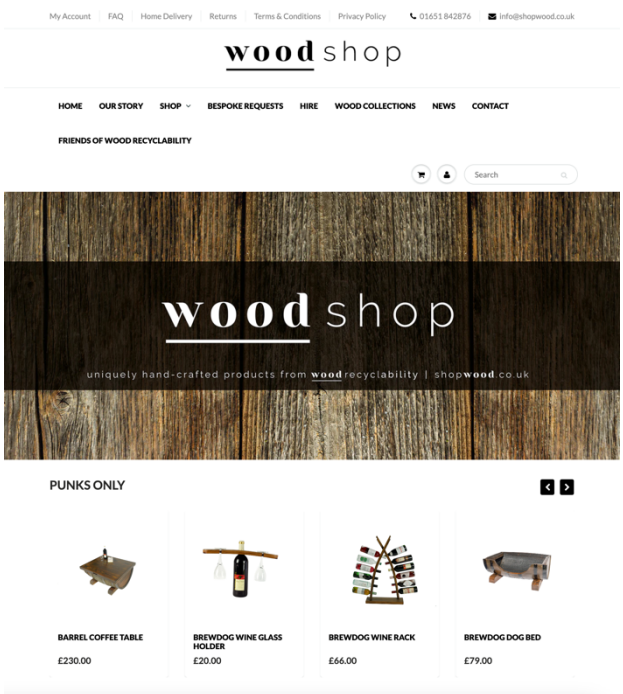


Figure 5 Wood RecyclAbility home page (credit: https://shopwood.co.uk/)

Wood Shop is a trading division of the Social Enterprise Wood Recyclability Ltd. They offer adults with a wide range of abilities the chance to experience a real workplace setting by making recycled wood products at their training centre in Pitmedden based in the Northeast of Scotland.

Wood RecyclAbility was set up in 1997 as a small social enterprise to provide practical work experience for people with additional support needs through working with waste wood. Over the last 21 years the organisation has grown steadily from 2 staff and 6 trainees in a small croft and outbuildings to 10 staff and up to 32 trainees each day in a new purpose-built workshop, yard and 5 acres of agricultural land.

The organisation established itself during a period when several offshore oil companies in the Grampian area were reviewing their waste policies. Waste wood, mainly from packaging, was identified as an abundant and valued resource in the area, one that could be transformed into a variety of useful products. As wood is an easy resource to work with, it has an array of uses and is ideal for providing trainees with a broad range of working experiences.

On average 1,500 tonnes of waste wood is collected and processed at the facility every year, mainly from offshore companies. Wood is graded on arrival and any contamination removed. Suitable clean wood is de-nailed and graded for reuse or recycling.

At the moment, the organisation is managing financially, but their operational side is struggling somewhat with the cost of living and a lack of new service users (adults). They have taken on recycling waste rigid plastics and are looking for new revenue streams such as the supply of Grade G50 woodchip for biomass.

Target Market: The organisation was set up to provide practical work experience for people with additional support needs.

Sources of income: Totally self-funded but they rely on grants for capital equipment purchases. Wood can be sold to local joiners or used to make a variety of products onsite including garden furniture, nest boxes, bird tables and other wildlife products. These products are sold, providing a valuable source of income.

8.1.1.3 Recycle Scotland – office furniture company

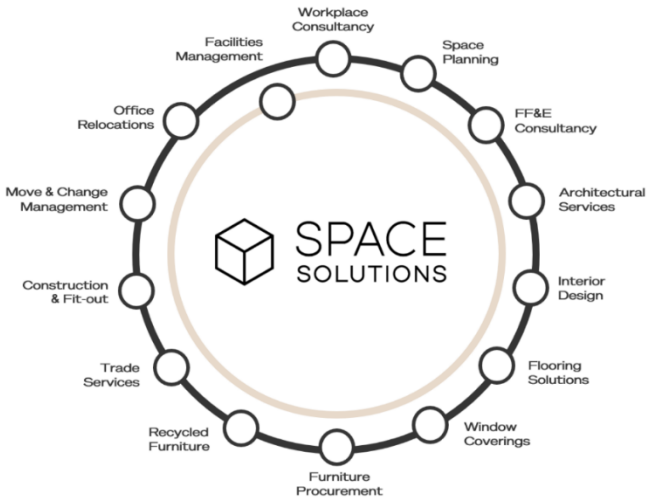


Figure 6 Recycle Scotland infographic (photo credit: https://www.recycle-scotland.co.uk/)

Recycle Scotland delivers solutions for the recycling of workplace furniture and/or the procurement of reused furniture. They partner with businesses to enable the direct re-use of office furniture and other assets. Their business model involves collecting redundant furniture and matching it with companies seeking a cost-effective, sustainable alternative to buying new.

Recycle Scotland helps businesses drive greater levels of direct re-use of office furniture and other assets. One example of this is a project which saw over 500 pieces of furniture from a single organisation go to 26 local Scottish businesses. As a result, 15,500kg of office furniture was saved – the equivalent of over a thousand office chairs – from going into landfill.

They work with businesses to understand their requirements and find solutions around repurposing, re-engineering, and recycling office furniture that is specific to each organisation. They work to ensure that each result is truly circular, eliminating the need for any furniture assets to be sent to landfill.

Establishing Recycle Scotland was a natural diversification to complement other services that Space Solutions already offered. Due to Recycle Scotland being part of Space Solutions / Corporate Moves they can use same labour and logistics, which is a huge benefit. The group offer quite a wide scope of complementary services (see graphic) including design and build and office moves to provide sustainable and better environmental solutions.

They often act as more of an intermediary regarding furniture, with the best option from an environmental aspect being to directly reuse from donor to recipient, but they also offer interim storage as part of their service if required. Their recycling service can arrange and manage the pickup and disposal of all the furniture, fittings, and equipment no longer needed. Depending on the quantity and quality of furniture, a resell value may be assigned to the stock.

There are three main routes for the products they deal with - rehoming exactly as it is, which is the preferred route, reuse with some storage, or where the furniture needs to be cleaned/ repaired/ refurbished.

The organisation was in the right place at the right time which put them ahead of the reuse and recycling movement before the government started pushing that ethos as much as it is currently. This has given Recycle Scotland a head start, which together with an existing work force, facility and logistics resources from their parent company puts them in a great position. They are looking at other models such as a planned take back system as well as the leasing and sales of reused products, remanufacturing and recycling they currently offer. They are Revolve certified.

Target Market: Larger private and public sector organisations.

Sources of income: Office clearance, sales of reused product, 're-engineering' (repair and refurbishment) a customer's products to return to them.

8.1.1.4 Gibb of Galston

The Timber, Architectural Salvage and Stone (TASS) part of the business was set up due to the owners' inherent love of the land and being a keen gardener. The owner hates waste and has always practiced recycling and reclamation. His enterprising spirit has seen him combine these interests, with the result of the creation of a company to sit alongside the animal feed part of the business, Gibb of Galston Timber, Architectural Salvage and Stone (TASS), which sells natural and reclaimed landscaping materials and timber from the on-site sawmill. The owner initially set up a landscaping business with elements of reclaimed materials around 2000, but with the reclaimed side being much more successful than the landscaping he focussed on that from 2010.

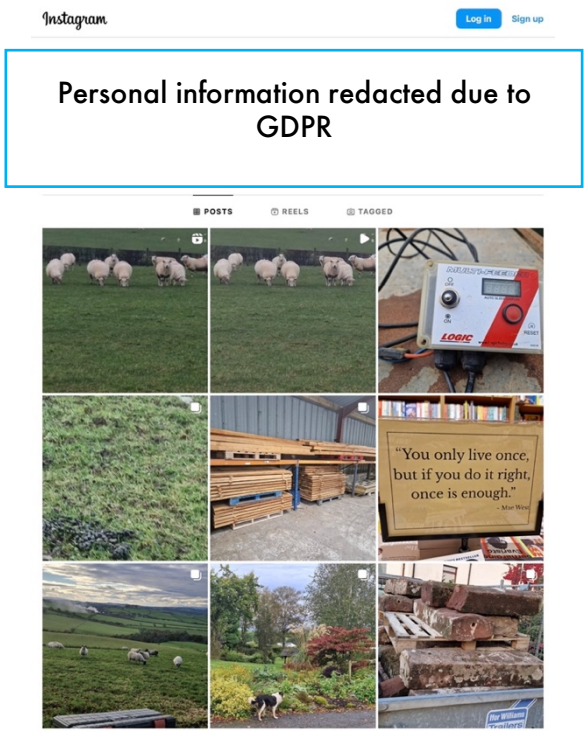


Figure 7 Gibb of Galston Instagram page (photo credit: Instagram directed via https://gibbofgalston.co.uk/)

TASS doesn't need to be very proactive in their search for stock, they have people approaching them all the time. They are also opportunistic and will buy interesting stock to

resell as it comes up, for example the contents of a church. Some feedback they were given in earlier years was that Galston was too rural and people wouldn't travel for reclaimed materials but it's set in lovely countryside with plenty of space for outdoor storage, and given there are a number of different parts to the business people visit there as a destination - to browse the antiques, enjoy the gardens at Threepwood Farm and walk the dog, and also then buy pieces for their garden or order something from the sawmill.

Target Market: Predominantly individual customers.

Sources of income: Self-funded. Sale of reclaimed products and materials.

8.1.1.5 Remake, Crieff

Remake is a community reuse charity run by volunteers and staff based at the Crieff Visitor Centre in Perthshire. They were founded in 2011 and became a registered charity in 2013. Remake aim to support, supply and inspire reuse for the benefit of people and planet. They do this by running Perthshire's only Reuse Hub which includes:

- A Scrapstore & Furniture Store- enabling people and businesses to donate unwanted items for reuse and to purchase good quality, second-hand items.
- A Community Tool Library – enabling people to loan a wide range of tools & equipment rather than buying these new.
- Repair and Reuse Workshops – supporting people to learn the skills to repair and reuse items themselves.
- Second-Hand Bikes- supporting the community to access environmentally friendly travel while also keeping disused bikes out of landfill.

Figure 8 Remake, Crieff home page (photo credit: https://remakescotland.co.uk/)

Their purpose is to promote the reuse of materials for the benefit of their community and inspire second-hand to become first choice. Additionally, Remake runs a zero waste/refill food store, commercial brokerage, community engagement events and a volunteer programme.

Remake has a physical store and an online shop stocking everything from crafting and fabric to DIY and tools, furniture and homewares - all saved from landfill and checked to Revolve standards.

The organisation is doing well having created strong partnerships within the community and local council. There is little to no local competition, which means often having surplus stock that is passed to local charity shops. However, despite considerable progress in increasing their self-generated income, they have also seen sizeable cost increases over the past year which means they still have a large reliance on grant funding. This leads to financial uncertainty year on year which can limit project continuity.

Target Market - Local communities

Sources of income – Approx. 50% grant and 50% self-generated. Sale of reclaimed products, workshops, refill store

8.1.1.6 Brewster Brothers, Cumbernauld & Livingston

Brewster Brothers are a recycling company, they take construction, demolition and excavation waste and process it through their state-of-the-art recycling plant to extract high-quality recycled aggregate, including sharp and soft sand and various sizes of gravel which can be used as they are or blended to make other products.

Figure 9 Brewster Brothers home page (photo credit: https://www.brewsterbros.com/)

Brewster Brothers operates under the principals of a circular economy, they aim to work within a closed loop system to ensure that any waste or by-products created by their business are

repurposed. They are constantly redesigning processes and harnessing innovation to improve the efficiency of their recycling plant. An example of this innovation is the Knowledge Transfer Partnership they have established with Heriot-Watt University to find new uses for the clay by-product from their wash plant which is currently used to restore the wider site.

The company would be very open to look at other products, particular brick, block, tiles and such that could be stored outside. They thought there would be a commercial model when a reuse hub gets properly established and scales up but that it would need subsidising to get started, including no/low business rates. The land value is key, the hubs would likely need to be situated where land values are higher, so it's an opportunity cost decision, what else could the land be used for instead. Perhaps the answer may be to look at less desirable sites such as old landfills being used for commercial reuse hubs? This is an important point, and a difference the authors know was felt at The Rebuild Site from rent prices in Carlisle to compared to Wolverhampton - different regions demand different land values/rates. The more desirable the area - and often then the easier to get to etc - the more expensive it is to have a hub there. Any new hub would have to balance access/desirability of location with affordability for the Hub to set up and be financially sustainable.

Target Market – Large clients and contractors

Sources of income – Self funded. Sale of recycled products.

8.1.2 Leading examples in the UK (but outside of Scotland)

8.1.2.1 The Rebuild Site, established 2021, located in Carlisle.

Rebuild is a surplus construction materials and products reuse hub, operating as a Community Interest Company. The depot is in part of an old air hangar, occupying a space of approximately 5,000 sqft/ 450 sqm indoor space, with outdoor space to the front of the buildings and two containers housing a community workspace and a Tool Library. The team offer a pick-up service from construction sites, ideally through a subscription, but will also take materials dropped off by prior arrangement. The rent was initially peppercorn but has increased to closer to market rate in the second year of operation.

Target Market

- Supply: Contractors, builders' merchants, wholesalers, retailers – more proactively with contractors/ construction sites but has grown more organically with other wholesale/retail end of line products too
- Demand: Community and charity groups, households, self-builders, gardeners, crafters and smaller tradespeople. Tradespeople tend to buy less frequently but in higher volumes.

Sources of income

- One option for collection charges is that contractors can pay an annual subscription, this facilitates the process as not having to sell the process each time to the site team, the paperwork is in place just need to arrange specific pick-up date.
- Sales from the shop

- Potential future income – workshops and training

Figure 10 The Rebuild Site home page (photo credit: https://www.rebuildsite.co.uk/)

A big part of the success of the facility is the reputation and existing established stakeholder relationships in the regional construction industry, the drive and passion of the directors and volunteers, and strong marketing, particularly social media. Social impact is delivered through providing products at a lower cost, donation of materials to community and charity projects, volunteer opportunities, low-cost access to tools and workshops.

8.1.2.2 Excess Materials Exchange (EME)

Key project in the UK for Meridian Water, Enfield (London) which was set up in 2022.

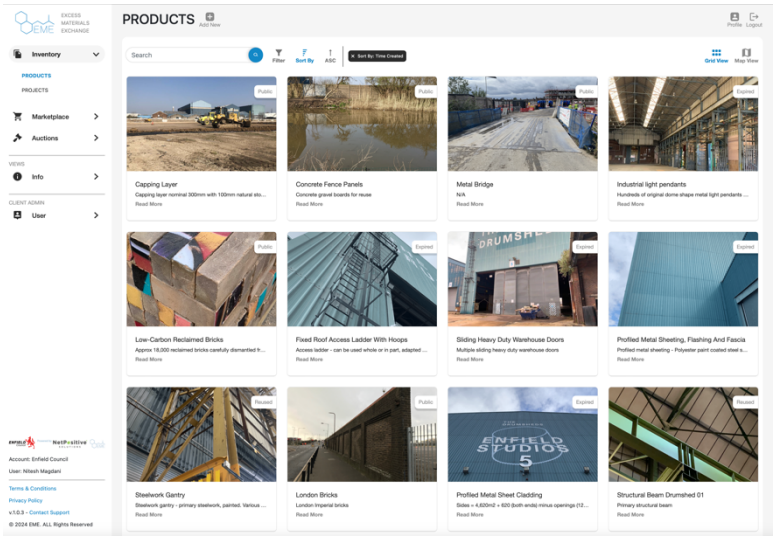


Figure 11 The Excess Materials Exchange Platform (Product page) (photo credit: Enfield Materials Exchange Platform)

Their digital platform matches excess materials and products to their highest value uses. Their vision for the platform is to speed-up the world's transition to a circular economy and support

the creation of a clean planet for everyone - by showing the financial and ecological value of materials and challenging companies to design and produce their goods in a more efficient and circular manner. And by doing a lot of 'matchmaking' between owners/donors of materials and products and recipients.

EME (the company) was engaged by Enfield Council for the Meridian Water project to create a pilot excess materials exchange (EME) and endeavour to reclaim and reuse as much of the materials on the site as possible. Using Enfield Council as a pilot, the hope is that the EME (project platform) will be adopted by other local authorities and business across London and the whole of the UK. Having initially focused on repurposing materials recovered from the Meridian Water regeneration project, the online platform was widened in 2022 to cover materials from all Enfield Council projects. The system is an online marketplace where products can be collected from the sites they arise on.

This example is different from the other case studies as it is local authority led – Enfield Council backed and funded the initiative. This also meant that the land required for storage was provided on site at no cost minimising the operating costs for the project. EME host open days, education sessions and site visits for designers, engineers and contractors to raise awareness of the initiative. Viewings of materials can also be arranged.

The initiative advocates pre-demolition audits which enable the EME (project platform) to understand what types of material/products will be coming into stock and allow for a little more certainty in terms of stock management.

Embodied carbon is one of the metrics which is captured in EME's current Digital Product Passport templates as a user entry field, and environmental, social and economic impacts are automatically generated for guidance on potential matches through EME's AI generated matchmaking tool. EME plans to roll out tools within the platform to automate the environmental savings and to generate a dashboard demonstrating value achieved through product/ material transactions.

Target Market: The platform is aimed for the commercial market (architects, developers, contractors) but can be used for those requiring smaller quantities, including households/individuals.

Sources of income: To date, funding for the development and use case in the UK has been solely through a subscription cost, although as the platform is increasing its exposure to other local authorities and private sector clients/ developers, the EME UK are exploring a mixture of subscription vs transaction-based business models.

8.1.3 Case studies in EU

8.1.3.1 Rotor DC (Demolition & Consulting, based in Brussels, Belgium

Rotor was established in 2005; it is a cooperative design practice that investigates the organisation of the material environment. Besides projects in architecture and interior design, they also produce exhibitions, books, economic models and policy proposals. In 2016 they launched the spin-off project Rotor DC – also a cooperative – to facilitate the reuse of construction materials, they dismantle, process and trade salvaged building components.

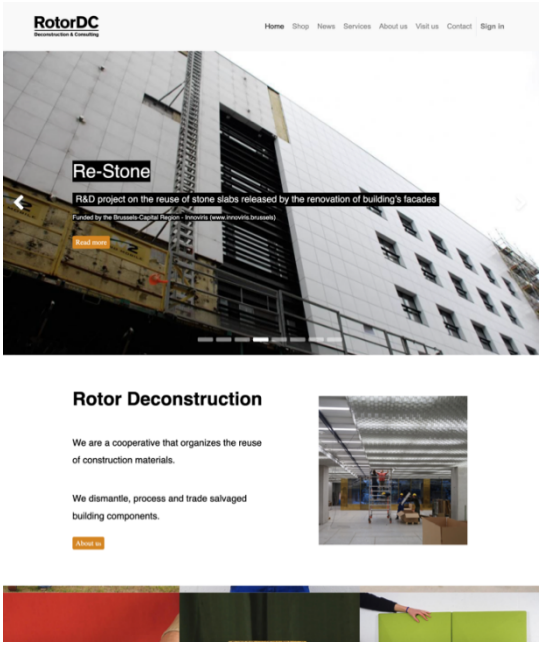


Figure 12 Rotor DC homepage (photo credit: https://rotordc.com/)

In the beginning they almost exclusively sold materials dismantled by their own workers, now their shop now also trades materials from several other suppliers such as demolition contractors and real estate companies.

Rotor DC's work is carried out by four dedicated teams.

- The **Acquisition** team focuses on sourcing sustainable materials and establishing partnerships.
- The **Process** team handles the materials physically on site (restoration and refurbishments, quality and stock management)
- The **Shop** team handles marketing, customer service, storage, and delivery.
- Our **Support** team manages accounting, HR, IT, and grant funding/ subsidies.

By trading in salvaged materials, they help reduce the quantity of demolition waste, while offering quality building materials that have a negligible environmental impact. Many of their materials are cheaper than new for the same quality. Some materials are equally expensive as new, but come with a great story, a deep patina or simply a clear conscience.

From time to time, pieces are for sale that were conceived by renowned designers, or created by skilled craftsmen, or made using technologies now out of reach. These pieces are a bit

more expensive but by using their materials they hope such items can be affordable to most people.

Rotor DC's business operates by documenting ownership of the materials that transit through their shop.

Getting involved in the whole process has enabled the Rotor team to develop deconstruction techniques, logistical systems and remanufacturing installations for contemporary building materials, with a focus on finishing materials. This gives the organisation a breadth of income opportunities beyond most of the other reuse hub examples. Their specialisations include:

- Repair and transformation of lighting equipment,
- A state-of-the-art method for removing mortar from ceramic tiles
- The reprocessing of high quality 'urban' wood
- Cleaning and preparing for reuse of furniture and building hardware, sanitary equipment
- Planning and organising of salvage operations in large and complicated buildings.

Interestingly Rotor has been documenting existing dealers of second-hand building materials in Belgium and in neighbouring countries since 2012, the results have been collated and are on the Opalis website – https://opalis.eu/en

Rotor noted that in doing the research they realised that despite the high level of professionalisation of the sector, many reclamation and reuse dealers focus on heritage or 'rustic' materials destined for the domestic rural market. Few were geared towards selling what comes out of large commercial buildings which historically, and still, makes up the bulk of demolition waste in urban areas and cities. Rotor Deconstruction grew out of the realisation that certain dots needed urgent connection.

In 8 years RotorDC has grown from an idea into a reliable partner for those who want to work with second hand building materials in Brussels and beyond. They have almost doubled their turnover in the past two years (2021-2023) and increased the number of employees accordingly. They had a call out for funding in 2022 which enabled them to finance 173.500 EUR out of the 250.000 EUR initially requested. This amount allowed them to move their facilities to a larger space and invest in equipment and tools necessary to develop a cleaning and re-packaging line for reused tiles. They are hoping to raise the remaining 76.500 EUR to achieve a third major objective – to increase their stock of reuse materials and improve working capital.

Target Market: Those who want to work with second hand building materials – at larger or smaller scale.

Sources of income: Sale of reclaimed goods, research projects.

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