

SEDA

Scotland Shifting to a Circular Economy

The Scottish Ecological Design Association magazine

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SEDA was formed in 1991. Our primary aim is to share knowledge, skills and experience of ecological design. SEDA is a network and links those seeking information and services with those providing them.

SEDA's membership is made up of a large number of people involved in, and with an interest in design, principally in Scotland. Members include academics, architects, artists, builders, planners, students, ecologists, landscape designers, materials suppliers, woodworkers, and many more whose work or interest is concerned with design for a sustainable future.

SEDA is a charity and is run by a Board of Directors, who are elected at Annual

General Meetings. The Board is advised by a voluntary Steering Group which meets 8 times a year for discussion and for planning the activities of the Association. All members are welcome to take part in these meetings. SEDA registered as a Company Limited by Guarantee in February 2011.

A SEDA membership is a great way to support ecological design in Scotland. As a member you will receive the SEDA Magazine for free, get discounted tickets to SEDA events and the opportunity to connect with a wide network of talented designers. Our upcoming events can be found boxed in green throughout this issue.

Cover image: Zero Waste Scotland

Editorial team

Nick Domminey, Viktoria Szilvas & Raina Armstrong

With thanks to all our contributors, sponsors, and supporters.

What do you think of this SEDA magazine? Do you have any disagreements or something useful to add to the issues covered? Do you have an idea for an article? Drop us an email at magazine@seda.org

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Editorial

Guest editors: Zero Waste Scotland

Clive Bowman

The simple truth is, the business as usual approach of over-exploiting natural resources is no longer viable for meeting the needs of a growing population. The global population has doubled since I was born in 1968. It is projected to increase by the same amount again before I reach my 90s (if I make it that far!). We urgently need to fundamentally change how we live and start to conserve and value all of the resources we use. We need to redesign products and services so we can keep materials in a whole life loop system for as long as possible in harmony with the environment, and ensure they can be naturally and safely disposed of at true end of life.

Shifting to a circular economy in Scotland, where all materials are valued and waste is absolutely minimised, will go some way to help address this. Looking beyond our borders, it can also help address the global environmental problems we all face relating to climate change, biodiversity loss and pollution. In

addition, I do believe a more holistic circular economy approach, putting people and ecosystems before profit, can also help address the many social injustices we currently have, by creating more local, sustainable jobs and resilient communities.

Zero Waste Scotland is Scotland's circular economy expert. The Scottish Government funds us to deliver results through campaigns, business support and policies for a circular economy, resource efficiency and low-carbon heating. We work across the whole of Scotland, maximising our reach through a collaborative approach with industry and key stakeholder organisations.

Zero Waste Scotland is lucky to have an abundance of knowledgeable staff that are passionate about the opportunities on the horizon for a better Scotland. Hence, I was delighted to be asked to be guest editor for this edition of the SEDA magazine. It is a great opportunity to showcase this passion and provide

SEDA members with a taste of some of the works that we are currently involved with.

From city regions to mattresses and bioeconomy, this SEDA magazine edition shows that there are lots of exciting solutions on the horizon. I feel, and am sure you will agree, there is clear alignment that this overall approach promotes a wider value view and fits with many of the broader issues SEDA members are concerned about. The other articles in this issue, such as on the conservation of traditional buildings and indoor air quality, all fit with this value first approach and contribute to embedding circular economy into all our lives.

I hope you enjoy this edition.

-Clive Bowman is the Strategic Business Case Manager at Zero Waste Scotland

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Traditional Buildings

& The Circular Economy

Katie Carter & Christina Stuart, Historic Environment Scotland

Today when we think about the circular economy, we are asked to imagine a world where there is no waste. But rather than relying solely on imagination, if we consider our not too distant history, we can learn a lot about circularity. Through necessity, our predecessors valued resources and lived more within the constraints of the world's finite materials. Traditional building practices and local knowledge are therefore a rich source of information for discovering circular solutions.

Blackhouses are a traditional house type that responded to the challenging climate of the north west of Scotland. With no chimneys, the heat of the fire warmed the thick stone and clay walls, before slowly escaping through the thatch. Regularly, sooted thatch would be removed and used to fertilise fields where, alongside other crops, straw was grown for re-thatching. This represents a circular economy within a croft itself, but did contribute to an indoor environment that wouldn't exactly be considered healthy now...

Another traditional material, lime mortar, is made from a mix of lime (calcium carbonate), water and aggregates such as sand. This mix & its application traditionally varied from place to place, depending on climate, locally available materials and waste from other building processes. For example, you might find burnt fuel from the lime kiln, or pieces of stone from shaping masonry, used as aggregate or pinning stones. In coastal areas, seashells were often used as a source of



lime and aggregate – presumably after the stonemasons had eaten any edible portions such as oysters!

Unlike hard cement mortars, correctly specified lime mortars and finishes, such as harling/lime wash, can also help walls deal with moisture and, by wearing faster than the surrounding stones, help protect them – ultimately lengthening the wall's lifespan. Should a wall eventually be altered, lime mortars can also allow pieces of masonry, such as bricks, to be reclaimed, reducing waste and allowing reuse.

Today at Historic Environment Scotland, we often have to be inventive in sourcing materials for our building and conservation work. For example, there are no commercial slate quarries left in Scotland, and whilst maintenance and repair extends the lifespan of roofs, inevitably a few replacement slates will sometimes be needed. Investing in traditional materials is one way in which we can support their availability. Alongside this, we look to sustainably procure high quality reclaimed materials that would otherwise be headed for landfill. For example, at the Engine Shed in Stirling we used wood from

a local barn demolition for our auditorium panelling, & stones from the previously demolished Seaforth Bridge, for consolidation of masonry.

More broadly, the fifth of Scottish homes that are over a century old demonstrate traditional buildings' durability and adaptability (a core circular principle), although maintenance and repair are critical to this continuing. The embodied carbon from construction of these buildings is also a major asset, and their appropriate energy efficient refurbishment is a key step in following circular construction principles & tackling climate change.

To find out about maintaining traditional buildings see Historic Environment Scotland's publications series. For our work on Circular Economy, see our Climate Action Plan.

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Nature Based Solutions

Delivered Through the Circular Bio-Economy

Dr. William Clark, Zero Waste Scotland



© Zero Waste Scotland
Food legumes

Increasing global population and associated consumption, along with additional resource demand and associated emissions is now recognised as a key driver of climate change, habitat degradation and biodiversity loss.

For example, food systems use 51% of the world's habitable surface¹, account for 70% of global freshwater usage, and generate 28% of global emissions. So, how do we feed everyone? How do we increase the productivity of the system without expansion and without increasing the other negative effects?

At the same time, more than one third of the food we produce, around 1.3 billion tonnes, is wasted, accounting for an estimated 2.2 billion tonnes of CO₂eq annually. Similarly, this means 1.4 billion hectares of land, or 28% of the agricultural area used to produce food, is also wasted at an estimated value of \$750 billion². It is safe to assume that without significant societal change, food waste and its associated emissions, the land and other resources required to produce that wasted food, and the resultant emissions will also accelerate, but there is an answer.

Circular Bio-economy

Nature has been developing elegant, value added solutions to food waste and emissions for millions of years as part of natural cycles. As plants and animals grow, they accumulate

nutrients and CO₂. When they die and decompose, the nutrients are returned to the soil and restore the balance. Our problem, that human activities have exceeded the world's natural capacity to recycle waste. It could also be part of the solution, however, because the foundation of food systems are based in nature. The circular bioeconomy describes these solutions inspired by nature.

Grain legumes such as peas, beans and lentils are important as they provide proteins, essential amino acids, starches, oils, and a range of nutrients. Forage legumes including clovers and vetches are either grazed directly by livestock³, or cut for hay or silage. Legumes are important for humans too, either by direct consumption or through animal products such as meats, milk, fish and eggs. By growing more legumes, we could create new markets and reduce reliance on less sustainable materials and increase domestic food security.

Scotland currently uses 129,000 tonnes of nitrogen fertiliser on crops and grassland per annum at an approximate cost of £38.7 million⁴, resulting in 3.2 million tonnes CO₂eq emissions⁵. Legumes, however, live with a symbiotic bacterium, which get sugars and other compounds from the plant, and nitrogen from the bacterium to help the legumes grow. Because of this, legumes sequester 50-100 kg atmospheric nitrogen per hectare, which reduces GHGs, and require almost no fertilisers. They support an increase in the yield of subsequent crops, and they reduce the requirement for pesticide. From this, by increasing legume coverage, we can reduce emissions, reduce pollution, save money, restore soils, regenerate ecosystems, support biodiversity, and improve environmental performance⁶. Pretty good for the humble pea?

Microalgae are single cell organisms typically found in freshwater and marine systems, and waste waters⁷. They offer certain advantages over traditional crops as their photosynthetic efficiency is far greater than that of higher plants so they can utilise huge volumes (1.7 t CO₂eq/tonne algae produced) of CO₂ when growing⁸. Moreover, they use much less land than other protein sources, and produce renewable protein for feeds and foods, nutraceuticals, pharmaceuticals, cosmetics, high value pigments, transport fuels and energy⁹. All from sunshine. Sounds awesome, but it gets better.

Robot trees and insect farms

Mexican innovators BioMi Tech have designed the BioUrban robotic tree¹⁰. Inspired by a real tree, the BioUrban tree is 4 meters tall and the microalgae are the (tiny) leaves. It eats 286 times as much CO₂ as trees, and also absorbs other pollutants from the air around it and generates oxygen, so like trees, it cleans the air. They even have built in lights, so they still 'grow' and harvest CO₂ at night.

One tree cleans the equivalent of an acre of forest which, according to developers, is the same amount that 2,870 people breathe and at



© BioMi.Tech
BioUrban robotic tree

the same time, the algae is also like a fruit as it can be harvested for a range of products. If we consider that 12 million hectares of vegetation was lost in tropical regions in 2018 alone, it really is a great illustration of delivering natural benefits in urban environments. Some insects such as the black soldier fly are detritivores which means they eat what we might think of as food waste. In nature they are a critical part of the food web as these insects eat plants and decompose materials such as wood. As they grow, they concentrate the nutrients, so they become a really nutritious food for fish, animals and birds. The nutrients they don't use go back into the soil.



The Black Soldier Fly *Hermetia Illucens*

So, we can take certain types of food waste, and use it to farm insects, which we can feed to livestock and even eat them ourselves. It's exactly the same as the natural process¹¹.

Insect farming can therefore help us recover nutrients from food waste and avoid the cost of management and associated emissions while producing a high quality feed ingredient for use in aquaculture. By reducing our need for soy or fishmeal, the pressure on forests and savannahs and oceans is reduced¹² which would also free up a lot of the land for other uses. As well as the protein, the insects' exoskeletons (skins) can be made into a biodegradable plastic, the oils can be used as a feed supplement for livestock or biofuel, and the manure (termed frass) is an excellent fertiliser to support the next harvest of crops and reduces the need for synthetic fertilisers¹³. Moreover, using frass reduces the need for pesticides and supports increased microbial life in the soils, which strengthen the food web. So, with the help of insects, producing more with less is very much possible.

Fungi food and fashion

We are all familiar with foods from fungi such as mushrooms, breads, cheeses and alcohol, but they actually have an amazing range of functions.

Commercial mushrooms are produced on materials such as straw, saw dust, and wood chips. As such,

mushroom-forming fungi convert low-quality waste streams into high-quality high value food proteins using very little resources or land. Depending on the species and operation, four or five different types can be grown in sequence using the same substrate¹⁴. Also, similarly to the insects, at the end of the process the spent mushroom compost can be used to improve soil structure by increasing organic matter, water capacity, microbial activity and biodiversity.



Mushroom forming fungi

Recently, fungi have been used to yield proteins from a variety of sources such as starchy effluents from food-processing factories and other industries such as distilleries, along with those from medicines, enzymes for industrial uses, commercial metabolites (acids, alcohols, pigments etc.), pesticides and



Mushroom headphone components and dress made from fungi

fertilisers¹⁵. Clearly, the energy cycling role that fungi play in the natural world could play a key role in displacing a vast range of fossil based resource-intensive ingredients.

Fast fashion is widely recognised as a resource- and pollution-intensive industry. However, researchers have recently developed a method to grow fungi using the readily-available nutritional waste resources of sawdust, corncobs and pistachio shells to form a leather and fabric analogue which can be dyed and has similar durability (1-2 years) as the traditional materials¹⁶.

Similarly, Scientists in Finland have developed a process to manufacture a mycelial plastic replacement and have grown a whole set of headphones¹⁷. For both products, the fungi components are fully biodegradable so after use, the nutrients can be cycled back into use again.

Nature based solutions

In conclusion, whilst these examples are inspiring, we are really only just starting to understand the full potential of a circular bioeconomy. Nature based solutions could indeed hold the very elegant keys to many of our current problems.

If you are interested in finding out more about the circular economy, the bioeconomy, and the nature inspired solutions we've looked at, please visit our website at zerowastescotland.org.uk to see our latest work.

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Maintaining 'Fresh Air'

The fight against Covid-19 and the climate emergency

Jenny Brierley, University of Sheffield

No longer do we take fresh air for granted. What we breathe in as we take our daily exercise outdoors has long been a concern, at least for those who live in cities. Now that Covid-19 has burst into our lives, maintaining fresh air in our homes has taken on a new significance¹.

The driver for increasing the airtightness of homes is the imperative of reducing carbon emissions from fossil-fuelled home heating². The unintended consequences of airtight

homes, however, have been well documented, particularly the impact of inadequate ventilation on health, even before aerosol transmission of viruses became an everyday issue^{3,4}.

Two factors have been centre-stage in explaining the ventilation performance gap. Firstly, the design and installation of ventilation systems does not always reflect the complex relationship between building fabric, heating and ventilation, and the need for resilience to a warming





© Zero Waste Scotland

Changing a filter

climate. Secondly, typical household activities and ventilation practices of residents attract criticism for inconsistency with low-energy design assumptions^{5,6}.

New research in progress⁷ is revealing just how critical a third factor, maintenance of the means of ventilation, is to achieving the optimum balance of energy use, air quality and thermal comfort in low-energy homes. Maintenance is widely noted in existing research as important in this context, but little attention has been paid to understanding what shapes maintenance practice and how it impacts the effectiveness of ventilation long-term.

Investigation of the experience of maintenance practitioners and residents, at five low-energy, rented housing association schemes across England, has uncovered practices that significantly compromise the

maintenance of effective ventilation in such homes. Where homes are over-occupied or under-heated, or where residents may be vulnerable due to age or health status, this can have profound negative consequences.

The findings indicate an entrenched disconnect between the design and build phase of a dwelling's life and the maintenance, management and occupation phase. It appears that maintainability of ventilation systems is generally not on the agenda at the design stage. The maintenance team typically has little or no involvement at handover and becomes involved only at the end of the defects liability period. Appropriate servicing plans are often not established at the outset, leading to ineffective ventilation. As well as undermining energy efficiency, air quality and resilience to overheating, inadequate maintenance can result in shortened equipment life, adding

both carbon cost and financial cost over the dwelling's lifecycle.

Significantly, the impact of indoor air quality on residents' health⁸ appears to be little recognised by the housing associations in the study. Given the lack of standards on domestic air quality and that the means of ventilation in new homes is not tested, although airtightness is, it is perhaps not surprising that ventilation is given a lower priority than health and safety issues backed by legislation⁹.

Fresh air is not, however, optional. The climate emergency and Covid-19 now both demand that the crucial role of ventilation maintenance is recognised in housing practice.

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Offsetting

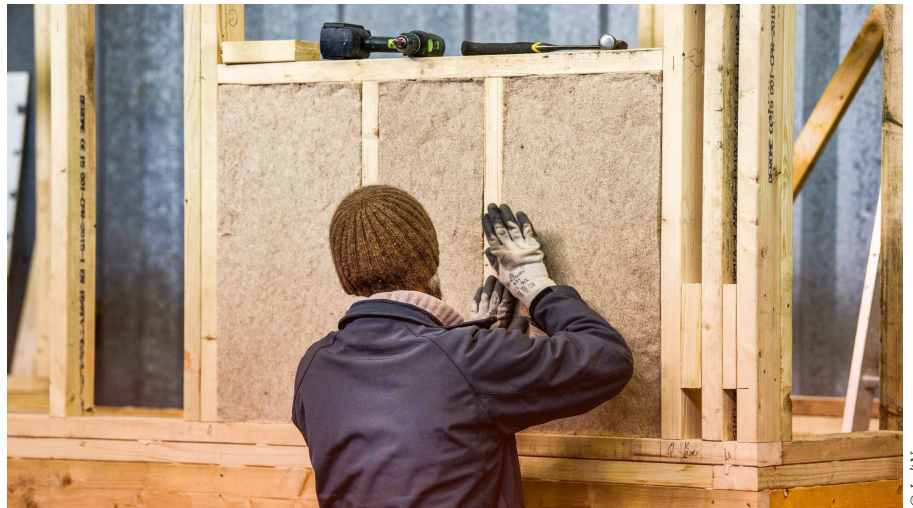
An effective paintbrush or a legitimate route to 2045 obligations?

Fraser Millar, Zero Waste Scotland

There's no getting around it - offsetting is a divisive subject. With all the prevailing uncertainty, controversy and stigma surrounding the concept, it's easy to see why many don't consider it a productive way to conduct low-carbon business. For other companies, getting to net-zero means tokenistic reduction followed by the purchase of bulk offsets and a pat on the back for a job well done. Why? Because offsetting is easier, almost invariably cheaper and far quicker than designing and implementing robust reduction policies.

Offsetting certainly makes for an effective paintbrush, concealing high-carbon operations behind a wall of forest green. But perhaps the element of offsetting that causes greatest concern is that it provides Scotland with an obvious shortcut to its 2045 obligations.

A recent and very welcome development in the realm of offsetting is the concept of 'carbon negative' construction. Just last month, Scottish firm IndiNature was the latest to receive funding from the Zero Waste Scotland Circular Economy Investment Fund to develop a new type of business - using 100% natural materials to create eco-friendly insulation for homes and commercial properties, with finished products absorbing more carbon than it takes to make them. *Net-negative construction*. The plant may not be opening until 2021, but the idea



© IndiNature

of producing high-quality building materials with a secondary offsetting function may well prove to be a game-changer.

The construction industry has long struggled with its excessive share of Scotland's emissions (around 5mt in 2015¹) and will likely welcome sequestering innovations with open arms, if the big players are willing and able to adapt. The IndiNature factory, located in the Scottish Borders, will have churned products with the sequestration capacity of over 5 million trees by 2050 – that's forest equalling the size of Barbados. And that's just one firm...

Responsible Offsetting

Offsetting can provide us with a quick and dirty win, even if getting to 2045 and net-zero requires a longer, cleaner fight. To properly discharge our obligations as a nation under net-zero legislation, we need to play the long game of measure

and mitigate, with a healthy dose of invention along the way.

Right now, there is a place in Scotland's net-zero plan for offsetting. For the foreseeable future, it's the only way to get us there - but we need to offset responsibly, minimally and not habitually. And we must only offset in the shadow of meaningful mitigation. When our fleet is greener, when our waste isn't wasted, when our buildings run on renewable and our meetings are virtual; when even the walls themselves are playing their part; if there's no other way to get to net-zero, then to offsetting we must turn.

1. zerowastescotland.org.uk/sites/default/files/Embodied_carbon_spreads%20final.pdf

This is an extract from a longer article first published on LinkedIn.

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Product Design and Procurement

A circular economy response to the climate crisis

Claire Guerin, Anastasios Markopoulos, Zero Waste Scotland

Consumption is key to human survival. Yet, paradoxically, our need for goods and products is, and continues to be, a primary contributor to the climate crisis we find ourselves in. It is estimated that four-fifths of Scotland's global emissions relate to the production, consumption and disposal of materials.

The consequences of this ever-increasing demand for natural resources have been brought into sharp focus with industries reeling from the impact of the coronavirus pandemic, spurring them to use this health emergency as a lens to assess their supply and value chains.

In response, what we purchase and how we consume products & materials has become a prevalent feature in an ongoing review of the global response to the pandemic. A green recovery could be key to this approach, with an emphasis on decoupling the effects of economic growth from their detrimental impact on our natural environment.

Circular Economy

A central component of Scotland's recovery planning, as laid out in the most recent Programme for Government, is the growth of a circular economy. At the heart of the circular economy approach is the aspiration to redefine the type of 'growth' we are aiming for: focusing our efforts on creating positive societal and environmental change. Applying this approach, with respect to our consumption, means extending the lifecycle of products and materials that are in use to as long as possible. This requires key characteristics, such as product longevity, durability, and reparability to be prioritised and embedded within the design and manufacturing phases. Furthermore, adoption of dynamic service models can also enable circular economy 'better practice', by maximising material value retention.

In addition to designing products for the circular economy, and as important, is the need to consider the way we buy products. Implementing circular procurement across public and private sector organisations will provide the necessary scale of environmental, economic and social benefits to deliver a Green Recovery. Zero Waste Scotland's '[Procuring for Repair, Reuse & Remanufacture](#)' report identified 13 categories and commodities that the public sector procures, where circular economy options exist. Analysis of spend data indicated these categories have a total value of £1.1 billion.

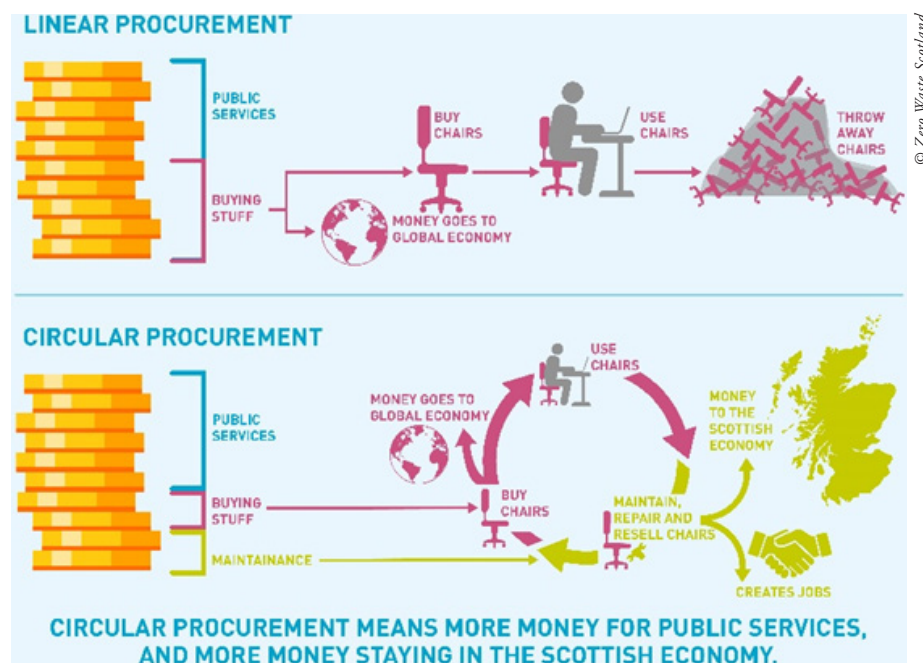
In a linear procurement model, products are often sourced from outside Scotland, meaning little of the public money spent generates domestic employment. With a circular procurement model, products may still be sourced from abroad, but they are serviced, maintained & repaired locally, since shipping items long-distance for servicing would be uneconomical. Zero Waste Scotland's 'Carbon Impacts of the Circular Economy' report has found that by mitigating the need to

manufacture new products we can save 11 million tonnes of greenhouse gases per annum by 2050.

Part of the Furniture

Furniture is a great example of this in action. It is the largest single contributor of greenhouse gases in a commercial building, accounting for 30% of total footprint over its 40-year lifespan. Many office-based organisations have realised major cost saving and environmental benefits from remote working during lockdown and will likely look to vacate or reduce office space in the coming months. Office downsizing will create a glut of office furniture and equipment which, if unused, will wind up as environmentally costly waste.

Scotland's public sector spends approximately £24m per year on furniture. Reused and re-manufactured items can be as much as 40-60% cheaper than buying new. Unlike new furniture and equipment, which is largely imported and therefore provides limited economic benefit, used equipment will need to be collected,





sanitised and serviced, catalogued, prepared for reuse or re-manufacture, stored and sold, all of which will create domestic employment opportunities at a critical time.

Several local authorities are already working with local SMEs to re-manufacture their furniture as part of their green recovery plan. There is an opportunity for Scottish designers to work in collaboration with the furniture supply chain to enable redesign and re-manufacture of office furniture for home-working, community, and education settings. Zero Waste Scotland

recently hosted a webinar, “[The Future of Furniture: circular solutions for a post-COVID world](#)”, the recording of which contains presentations from both suppliers and buyers from various European countries, including the UK, sharing their experiences of developing and procuring circular business models.

Zero Waste Scotland is currently a partner in ProCirc, a three-year circular procurement project, part-funded by the eco-innovation strand of the European Union North Sea Region Interreg Programme. The project aims to scale up the development of circular

business models, products and services by implementing changes to public and private procurement. More information is available on our [webpage](#). Please keep in touch via signing up to our [mailing list](#) to receive our newsletter.

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Mirroring the Netflix Model

For clothing

Anna Graham, Zero Waste Scotland

In Scotland, around 235,000 tonnes of textiles are procured on an annual basis. At the same time, 166,000 tonnes are discarded every year, of which 86,000 tonnes end up in Scottish landfills. While this is a tiny proportion of the total residual waste generated each year, accounting for just 1%, it is only second behind food and animal waste in terms of carbon intensity, contributing a weighty 17% to the associated carbon impact. On this basis, it begs the question, what role does product design and circular procurement have in keeping textiles out of landfill and in use for longer?

In the recent report published by the Ellen McArthur Foundation which identified 10 circular investment

opportunities to build back better, clothing rental and resale business models were identified as one of two opportunities helping to address both short and long-term goals of the public and private sectors. This can be achieved whilst also meeting government priorities in areas such as economic recovery, circular economy growth potential and economic resilience, reducing the risk of future shocks.

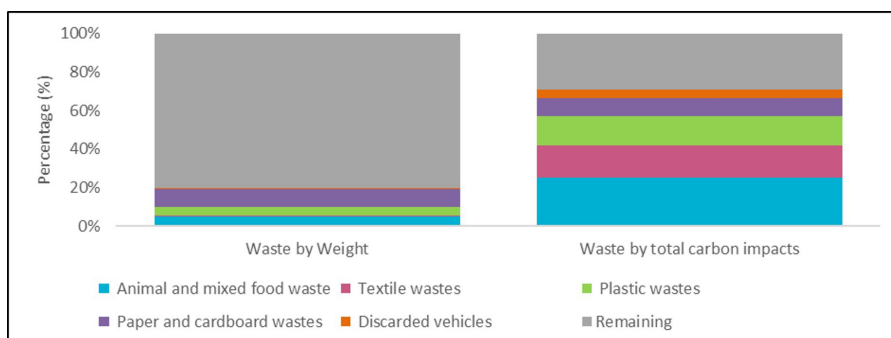
The market for clothing rental and resale is growing substantially. Before the pandemic, strong growth was projected for both rental and resale business models, with revenue from rental models alone poised to increase by \$801 million between 2019 and

2023. So, what opportunities does this present for Scottish businesses?

One Scottish company that is capitalising on the emerging clothes rental market is formalwear hire firm ACS. In response to the impact of the coronavirus on their primary business, they stepped up moves into everyday clothing rental signing contracts to provide back of house laundry services for a number of mainstream UK operators. In a recent interview with the Herald, Andrew Rough, ACS’s chief financial officer told the reporter “The fashion industry has to change, and we are changing with it, ... more and more companies in the US are mirroring the Netflix model for clothing. That to us is where the industry is moving.” Combined with providing garment cleaning services for 80% of the UK menswear rental sector, ACS has created a more resilient business model responding to changes in the marketplace. “Consumers are recognising the glut of fast fashion,” he said. “People realise they have got to make more sustainable choices.”

Anna Graham, Textile Analyst, Zero Waste Scotland

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Top five waste materials by carbon impacts and their associated weight 2018

Circular Cities & Regions

A new approach

Cheryl Robb, Zero Waste Scotland

Where do you live? Why do you choose to live there? And what would make your local area even more liveable, thriving and resilient? These are the very first questions to ask when considering the notion of circular places.

It is well documented that cities are becoming over-burdened, with estimates that two-thirds of the global population will be living in cities by 2050. With this comes the challenge of meeting the demands of the residents – homes, energy, job, leisure and education opportunities, transport, food, clothing, and other goods and services. Cities consume over 75% of natural resources, produce over 50% of global waste, and emit between 60-80% of greenhouse gases.

Equally relevant in Scotland are the very different challenges of our rural communities. The Highlands and Islands of Scotland account for just over half of Scotland's landmass but less than 9% of its population, giving the region the lowest population density in the UK (and one of the lowest in Europe). Of a population of 470,000 in the region, 62% live in remote areas. Access to appropriate and affordable housing is a constraint to both population attraction and economic growth. Nearly a quarter of the area's population are aged 65+ and the local authorities in this part of Scotland have the highest levels of fuel poverty across Scotland.

So, how can we introduce circular economy principles to meet the diverging challenges of these areas whilst helping them to thrive in a way that is sustainable in the long-term, and does not negatively impact on other parts of our global community? We need to start thinking of places as co-dependent systems and tackle challenges holistically, instead of piecemeal and often tackling one issue at the expense of another. A 'circular places' approach does just that.

In a circular place we would see:

- An engaged local population which understands and is committed to circular initiatives;
- Joined-up systems thinking to provide the products and services we need from food to sanitation, heat, shelter and transport;
- Places that are planned and designed with circular principles in mind and where the built environment becomes a part of the system providing circular services (eg material banks) and offering flexibility and adaptability for the local population;
- Thriving sharing systems for citizens and businesses, supported by a strong and connected reuse and repair economy;
- Local government procurement policies which embed circular principles;
- Businesses collaborating locally to reduce material consumption and waste generation, perhaps through a move to more service-based

business models;

- A local workforce with the skills to deliver all of the above.

Thinking and practice on circular places have been rapidly evolving over the past few years – from the world's first 'city scan' in Amsterdam (developed by [Circle Economy](#)) – and the second on our own shores in [Glasgow](#) – looking at how materials flow through cities and using that as a means to identify opportunities to introduce circularity. Current work by the [Ellen MacArthur Foundation](#) supports urban policymakers to enable a circular transition, focusing on opportunities in three key urban systems - buildings, mobility, and products.

In Scotland we have embraced this notion of circular places. It can provide benefit not only from a carbon reduction perspective but also provide economic resilience and social opportunity. Zero Waste Scotland's work with Glasgow Chamber of Commerce, Glasgow City Council and the Dutch consultancy Circle Economy in the development of the City Scan identified a range of opportunities in key sectors in the city. We initially focused our activity on manufacturing, specifically in the food and drink sector, engaging with businesses to illustrate the opportunity of embracing a circular approach, for example, through utilising spent grain from the brewing process in the production of bread and other products.



This work captured imaginations and interest and provided the springboard to roll out our approach to other cities and regions of Scotland: Edinburgh, Tayside, and Aberdeenshire. Most recently we established a partnership with Highlands & Islands Enterprise to introduce circular economy principles to their business and community engagement activities.

The key lessons to date are:

- **The value of working in partnership** – we can reach further by working closely with local Chambers of Commerce delivering existing initiatives, and with organisations that are well engaged with the business community to raise awareness of circular economy opportunities.
- **The importance of co-development** – we recognise that for circular economy to truly become embedded and gain traction, we need to co-develop the visions and practical action with a range of local, place-based stakeholders – local authorities, businesses, citizens, community representatives, colleges and universities to name a few.
- **Building capacity on circular principles is essential** – in order to realise change, we first need to support citizens, the business community and policymakers to understand the principles of a circular economy and translate that into an understanding of how embedding circular principles can



© Zero Waste Scotland

The use of grain-based products in both breweries and bakeries means that opportunities for synergies exist between the two industries

- help achieve a more sustainable and resilient city/region.
- **The benefit of tailoring activity to fit with each local area** – there is no ‘one size fits all’ approach. It is important to support each area to focus on sectors and themes that are a local priority. For example, how can Edinburgh deliver ‘circular festivals’, or what opportunities are there in the fisheries sector in Aberdeenshire, or for soft fruit farmers in Tayside?
- **We need to make clear the connection between tackling climate change and circular economy** – four fifths of Scotland’s carbon emissions are caused by the heat and energy required to grow, make, process, transport and provide goods and materials. Many local authorities have declared a climate emergency and are developing plans to tackle this.

We need to ensure the link between carbon emissions and circular economy is well understood, and these principles are wholly integrated into all plans.

Finally, a look to the future... building on the above, we are supporting the engagement, evidence building and capacity building required to move this agenda on at pace. We want to establish a network of interconnected circular places in Scotland, sharing lessons so we can collaborate and move faster together. Ultimately we will support each place to establish its own circular vision, take ownership of this agenda and move towards a country of liveable, thriving and resilient places.

Cheryl Robb is a Stakeholders & Partnerships Manager at Zero Waste Scotland

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New Visions for Land

6 conversations



It was about this time last year that I watched George Monbiot's Channel 4 documentary 'Apocalypse Cow' while reading 'Wilding' by Isabella Tree. The combination of these two left a big impression on me and I found myself looking at the countryside with a more critical eye. Whereas previously I enjoyed the rolling fields of Midlothian, dotted with trees, I now notice the monoculture, the lack of wildlife and the scarcity of woods.

This led me to the idea of running a SEDA event about Scotland's approach to land use. After all, we design the landscape.

Land Conversations

Initially we intended to run a one day conference as a fringe event to the original COP26 in Glasgow, but the coronavirus pandemic delayed the climate change event and gave our conference extra urgency, so we decided to hold a series of six online "conversations" in March and April 2021. Rather than work under the conventional headings of farming, renewable energy, forestry and ownership, we opted to focus

on six themes or conversations that straddle these topics. We want to break down barriers between entrenched sectors and encourage holistic thinking, while drawing on grassroots knowledge, different disciplines, and emerging science.

Our goal is to bring together a cross-section of people with an interest or stake in the future of land use in Scotland; from sectors including farming and estate management, forestry, renewable energy, tourism, regulation and government. David Seel (SEDA ex-chairperson & co-organiser) and I have been surprised how little dialogue there is among these disparate groups. As an independent third-party, SEDA is in a good position to bring them together. By going back to basics, analysing the evidence and discussing new ways of building bridges between different sectors we hope to shift entrenched positions and open up new ways of thinking about land use.

Gail Halvorsen, Halvorsen Architects

Themes for the six conversations:

- 1 **The Lie of the Land**
How climate change and food security will drive future land use in Scotland
- 2 **Soil & Growth**
The science and ecology of soil: carbon emissions and carbon capture explained
- 3 **Ecosystems & Energy**
Promoting biodiversity: the role of natural resources and renewable energy
- 4 **Natural Benefits**
Nature's impact on health: creating inclusive local economies
- 5 **New Rural Economy**
Changing economic patterns: reimagining where we live and work
- 6 **A Story for the Future**
Art and community: hard facts alone don't win the argument.



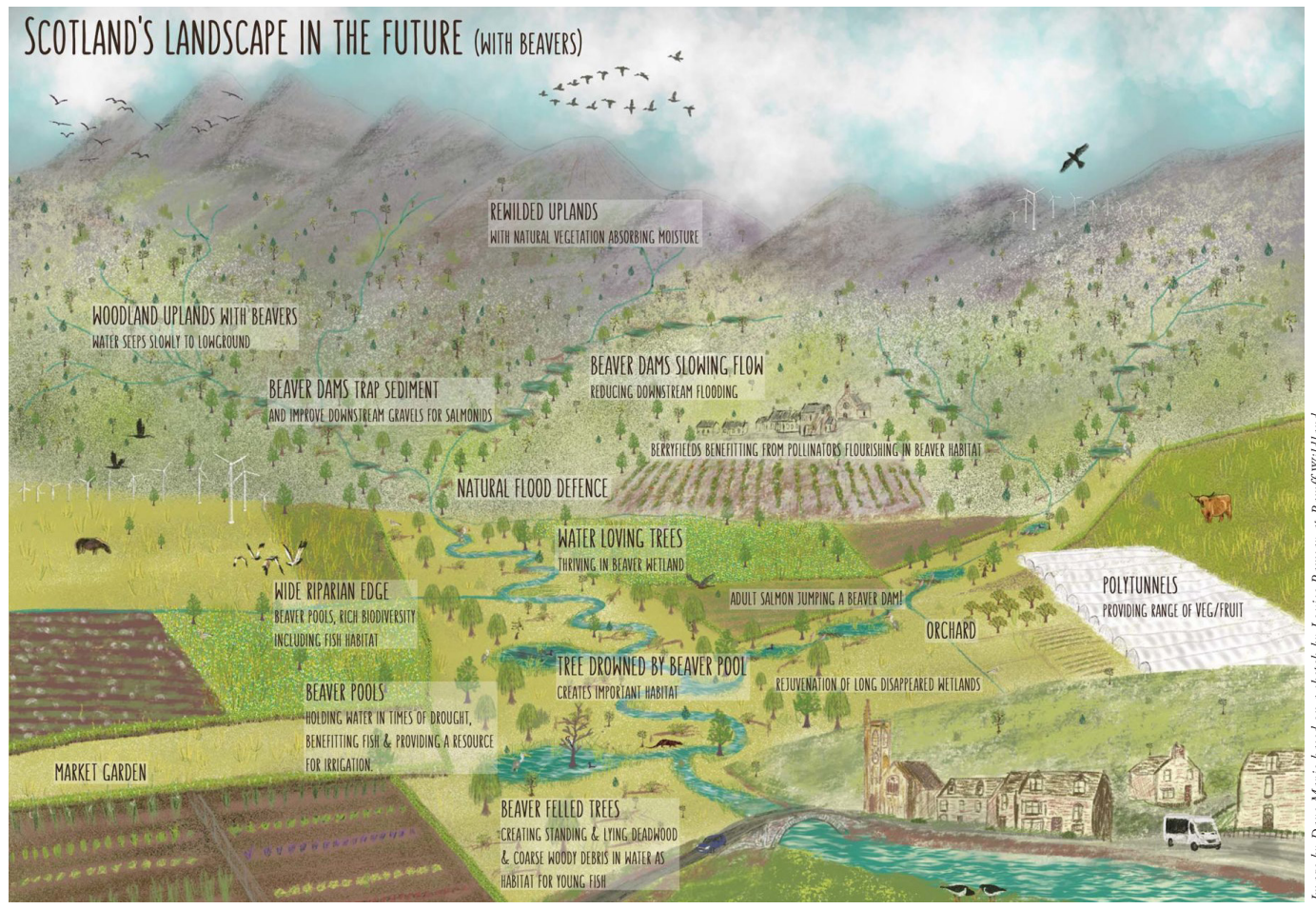
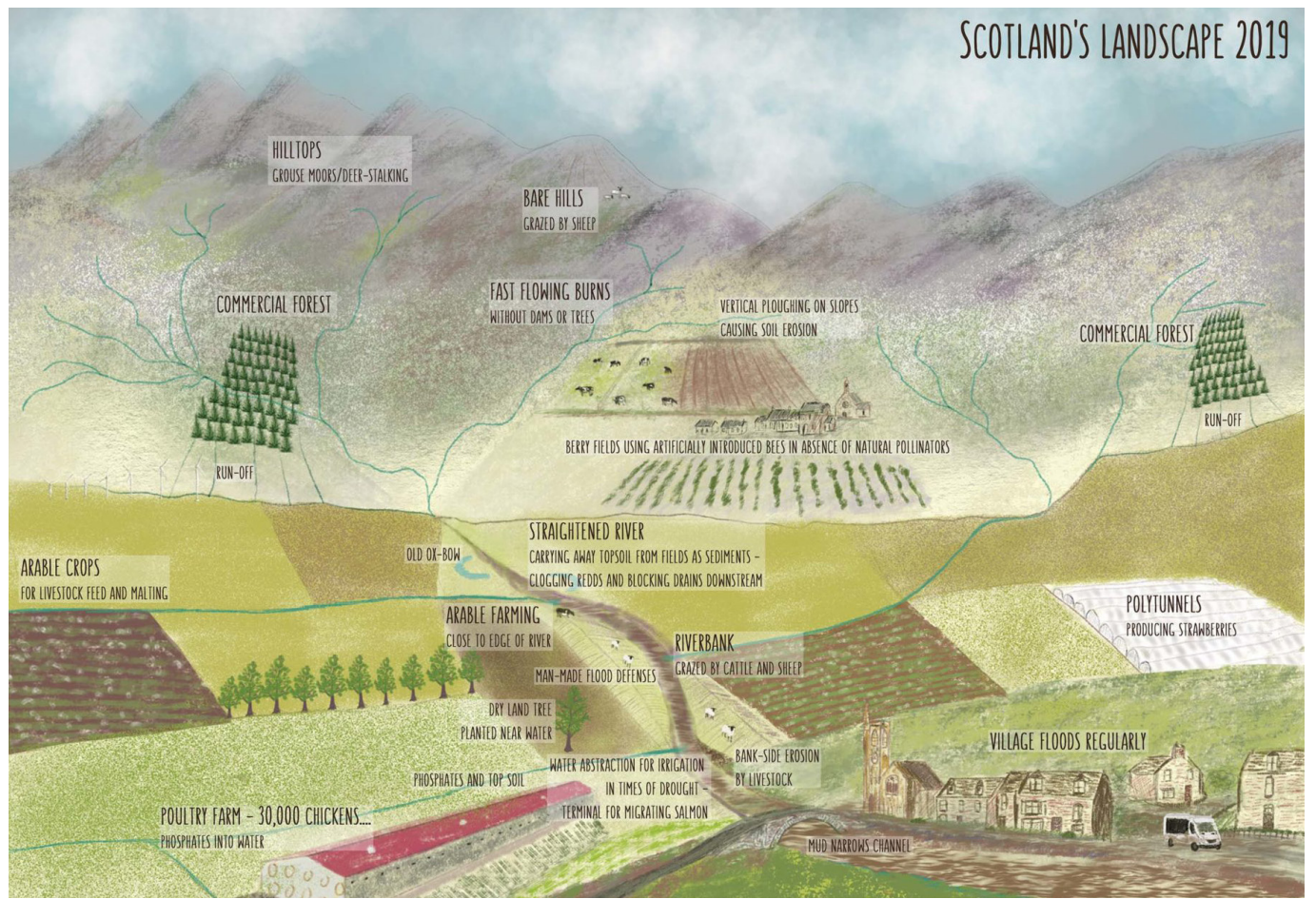


Image by Dene Marie based on a sketch by Louise Ramsay at Bamff Wildland



NatureScot

Scotland is ahead of England with the Scottish Land Commission and the Land Rights and Responsibilities Statement both established in the wake of the Land Reform (Scotland) Act 2016. Part of the current problem is undoubtedly the heritage of the disparity of land ownership in Scotland, but this event will concentrate on land use and land management, not ownership.

There are a surprising number of landowners wanting to do things differently; who are aware of their obligation to combat climate change, increase biodiversity and involve the local community. For some the emphasis is on rewilding (Anders Polvsen at Glenfeshie) and for others it is on local community (Ninian Stuart at Falkland). Jeremy Leggett (former scientific director at Greenpeace) is teaming up with and investing in local timber frame manufacturer Makar for new eco-tourist and affordable starter homes at Bunloit, an estate he recently purchased on the north shore of Loch Ness. The eco-building on Bunloit has the wider aim of deep emissions reduction and Build-Back-Better reconstruction in Scotland.

We will also be drawing on the work by organisations such as the Hutton Institute, the Soil Association and Nourish to promote more sustainable agricultural land uses, as well as addressing the renewable energy sector, large sporting estates, tourism and the timber industry - all competing for the same resources.

Land contributions

One of our main speakers, Magnus Davidson of the University of the Highlands and Islands Environmental Research Institute, has developed a vision of what a 21st Century rural Scotland might look like. He foresees a region that works for both people and nature, where centuries of depopulation and ecological degradation are reversed, a restored, re-peopled, and re-wilded landscape that incorporates the vast renewable potential of rural Scotland, leading to sustainable industries and communities rooted in the unique social and cultural traditions of our rural areas.

One example of interdisciplinary thinking is from Mór Hydro Ltd. who re-saturate Highland peat bogs by blocking the drains which dry the land for grouse breeding, and using the stored water for hydro power. This win-win situation improves carbon storage, biodiversity and potentially, greater revenue to the estate owners.

The response to our Conversations idea has been incredibly positive. The Hutton Institute has offered to act as scientific consultants for the conference. We already have an impressive array of speakers from academia, landowners small and large, communities running land, policy makers and NGOs to poets and writers. Scottish National Heritage, The Scottish Land Commission, Scottish Land & Estates, The Landworkers' Alliance, Reforesting Scotland, The Crofting Commission and Sustain have already agreed to participate.

Mapping

We are working with the Hutton Institute to provide a series of online, interactive maps showing the distribution of land uses of the whole of Scotland in the past, present and future, inspired by Scots planning pioneer, Ian McHarg.

The data for these maps will be provided by scientists who make projections, drawing on a range of scenarios for a sustainable and more self-sufficient future. Their assumptions will be based on demographics, consumption habits and culture, energy use, economics and agriculture. We are sure that these maps of the future will challenge people's preconceptions and be a catalyst for discussion.



Artistic involvement

An important part of the conference, reinforcing the idea of out-of-the-box thinking, is the contribution of artists in every conversation. Artists bring a fresh perspective. Interspersing highly personal reflections of song, poetry and video into the relatively dry discussions will provoke the panel and audience to look at each topic in a fresh

way.

Outcomes

Our aim is not to come up with definite solutions but provide a body of work to help inform future land-use decisions in the form of the maps and a report summarising all 6 conversations. These will be available to participants, policymakers and the public. We hope to spur Scotland-based charities and

NGOs to engage with the broader issues around changing land use.

A lot of scientific research has been done in this area but is not in the public domain and, to date, it has been presented piecemeal. New Visions for Land is, as far as we are aware, the first time that all the issues affecting rural land will have been addressed at the same time; another for SEDA.

Gail Halvorsen, Halvorsen Architects ■

Giroscope Self Build Hull:

Part The Fourth

Duncan Roberts, Architect

As these words are being written the triple-glazed doors & windows are crossing the North Sea by ferry & headed for the Port of Hull.

All the door & window openings have been formed in the double stud walls & much of the fibre-board sheathing is in place so the windows can be taken straight from the lorry & into the houses to be installed immediately.

With the roof sarked & battened the PV installers now have a free run with their roof-integrated panels. Although there were plenty of companies offering competitively priced PVs it proved much more difficult to find anyone locally who could or would install solar hot water panels - such is the shift in the market under the influence of the feed-in tariffs.

The DIY spirit being alive &



Duncan Roberts

well within Giroscope, however, they have decided to purchase the panels & flashing kits directly & install the system themselves - exactly as they did on their earliest refurbishments over 30 years ago.

As the houses have gradually taken on their final appearance - with roofs, dormers, doors & windows - there has been a raising of the spirits generally

despite the difficulties encountered in the five years since this project was first mooted. The long gestation has caused drop outs amongst the original self-build team but recently one of the young trainees working on the project applied for & has been offered a tenancy in one of the end of terrace houses, so the self-build ethos lives on.

Duncan Roberts ■



Sustainable Design Accreditation

A fresh take.

Frances Grant & Chloë Yuill

Having authored the RIAS Environmental Policy and conceived the Accreditation Scheme in Sustainable Design in 2001, Sandy Halliday fills us in on her ambition to revamp it.

The latest updates set out to question our practice and curiosities that lie at its core. The accreditation promotes the critical evaluation of our design choices to gain holistic understanding of our decisions.

Guidance

"When first launched, I had about 20 different advisory issues that we should consider. Early on it became quite clear that if you give people 20 boxes to tick, they tick 20 boxes. The format does not tell you much about what they know, what they have learnt or how enthusiastic they are.

The kind of guidance you should be looking at is [the R.I.A.S.] environmental policy: "maximum architectural value minimal environmental harm". Then the only criteria are what did you do, what did you learn, and what would you do differently?

It is not an organisation or a practice but an individual that gets reviewed. The whole intention is for it to enhance your own learning experience. Then it is up to the peer reviewers to interpret whether you 'get it' because if you do 'get it', you will always get it. You will challenge every specification: when it says concrete you will ask, "well why can't we use timber?" It is, therefore, much more

about satisfying a line of enquiry into how you resolve things and challenge the status quo.

Individuals should be pushing their boundaries until they are able to turn around and say they have no more boundaries to push. At that point you cross them off the list and start again. There are always more boundaries to push."

So why update it?

"There was an intention that it would be continually updated and that all architects would be subjected to a quinquennial [recurring every 5 years] review, but there was nobody there to do it so nobody did.

I guess what sparked the accreditation again has been the change at the R.I.A.S., that we need to make the sustainability thing cool.

What we want to do is look at the terms of the accreditation, see how we can encourage more applications, and find out why we cannot get the government to require sustainable architects on serious projects. That will hopefully be the point at which we relaunch it properly, demand a quinquennial review and provide a pathway for students.

To be frank, originally I didn't even consider having a student pathway because it was down to the idea of 'what you have done and achieved in practice'. I also had this ridiculous optimism that students coming through the last 20 years would be developing that knowledge already and that by now we would be getting to the point where the accreditation scheme would be almost



RIAS

SUSTAINABLE ACCREDITED © RIAS

redundant, which evidently has been not the case.

What I am proposing is to ask students to submit any projects they have been working on and their dissertations. They could potentially graduate as students accredited in Sustainable Design, creating young champions that could become pathfinders for others."

How she sees it informing policy:

"I think there is an awful lot of best practice which could be giving a stronger direction to policy: dealing with indoor environment, supporting communities, the social projects people have put forward, biodiversity response, energy efficiency, sustainable materials, to give a few examples of the scope of projects on the ground."

What next?

"I need to hear from other people to understand the fundamentals of it and see if it fits with people's experience, to know what value it has now.

It's nearly been 20 years since I conceived the accreditation, I guess by now I thought that 'designing sustainably' would already be the 'norm'. I don't see why people should be designing anything other than sustainable buildings." ■



Visionary. Progressive. Pioneer.

Interview with Sandy Halliday

Frances Grant & Chloë Yuill

Sandy Halliday is one of few anomalies about whom most adjectives do not do justice. Her articulation of subjects, from the fundamentals of the built environment to the tomato plants growing in her front room, expresses energy so palpable that you cannot help but feel electrified. A lady laced with aspiration, optimism, and hope of a better tomorrow coupled with the courage to begin today.

Sandy talks of architecture in the form of new professionalism; if you are not designing for the environment what are you designing for? When we design sustainably, we are designing within environmental boundaries, with supporting communities, with fairness and equity. If we can learn to treat the environment better, we can learn to treat each other better.

Touching on architectural education, she champions designing with ambition and optimism stating that you can design with anything as

long as you detail it right. She advises that on every project you should think about the fundamental aspects of the five principles: delivering resource effectiveness, minimizing pollution, creating healthy environments at all scales, promoting biodiversity and enhancing communities. This, she argues, is your principal job.

On mistakes, she reassures us that we will make them. You are allowed to make mistakes, but you should not be allowed not to care.

When asked what she thinks about Covid-19 she tells us the thing that changed was her fundamental understanding of what the economy is for: essentially to support us, support our lifestyles, and support what we do, remarking, "if it's our job to go out and 'save Pret', we really have lost the plot". The principles of sustainable choice even run through her caffeine fix: support local, create sustainable economies.

She reminds us of many environments transforming across Europe; houses are being improved, the places being created are diverse and rich, and are supportive of community and access to amenities. To Sandy, those are places that provide the level of support that we have always needed, especially now as we learn to live with Covid-19. She remarks, however, "I just don't have any conviction that the penny has dropped hard enough. In fact, I don't quite understand what people think the essence of spending 70 years on our planet is, if it's two cars in the

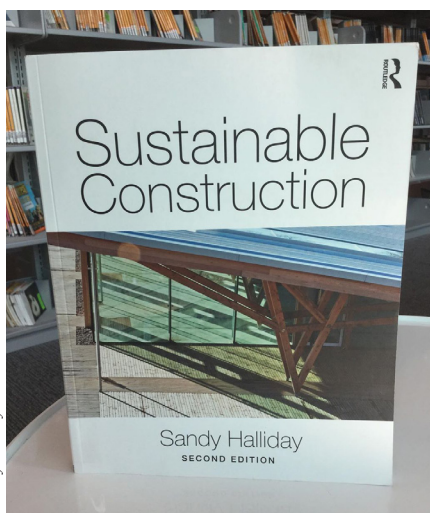


© Sandy Halliday

drive and a detached house made of plywood".

On COP26 she believes that Glasgow will start taking sustainable construction seriously and initiate some significant policies. She does point out, however, that we should not place all expectations on the big event. Sandy reminds us that the potential to have 100,000 different activities within one's own home, community, village (rather than spending 100,000 air miles on filling up some rooms in Glasgow) has great appeal.

Sandy is undeniably a trailblazer in her attitude, dedication and vision towards our collective and sustainable future, and what impresses us most is the possibility that all her proposals could be achieved by individual action and an environmentally conscious approach to our daily lives. Having the opportunity to discuss all things environmental with her allowed us to fully understand what sets her out as someone remarkable. It is not just her vision but her commitment to facilitating others to care that helps educate and bring about much needed change. ■



© Sandy Halliday

Metal Springs & Polyester Wadding

Wake up on the right side of a circular mattress

Anastasios Markopoulos, Zero Waste Scotland

An average mattress comprises approximately 40% textiles, including woven & non-woven materials, and natural and synthetic fibres. The remainder of the mattress consists of foams/ filling materials and metal springs. The range of materials and components present significant challenges for maximising circular economy opportunities at the end of life.

In Scotland, less than 1 in 10 of the estimated 600,000 mattresses disposed of each year are recycled. Their bulkiness and large volume deter landfill site operators across the UK from accepting these items, and raise questions around the cost effectiveness of transportation. Local authorities will generally collect mattresses alongside other furniture items as part of a bulky waste uplift service, and in part to tackle fly tipping.

Deconstruction and shredding are the two most widely used methods

for mattress recycling – the latter is generally used when a mattress is more contaminated (e.g. wet & stained). The metal from springs is always recycled, and some of the soft elements recovered can be recycled into products such as equestrian floor lining and carpet underlay. Much of the remaining material, however, is currently used as fuel for energy from waste.

Mattress recyclers need suitable infrastructure to ensure mattresses remain as dry and free from further contamination after collection as possible to maximise the potential for circular outcomes. They must also ensure the materials and components they recover meet standards for hygiene and safety compliance before selling them onto secondary markets. Metal from springs and polyester wadding are considered to be the most valuable, although smaller markets exist for the remaining materials and components.

More Mattresses

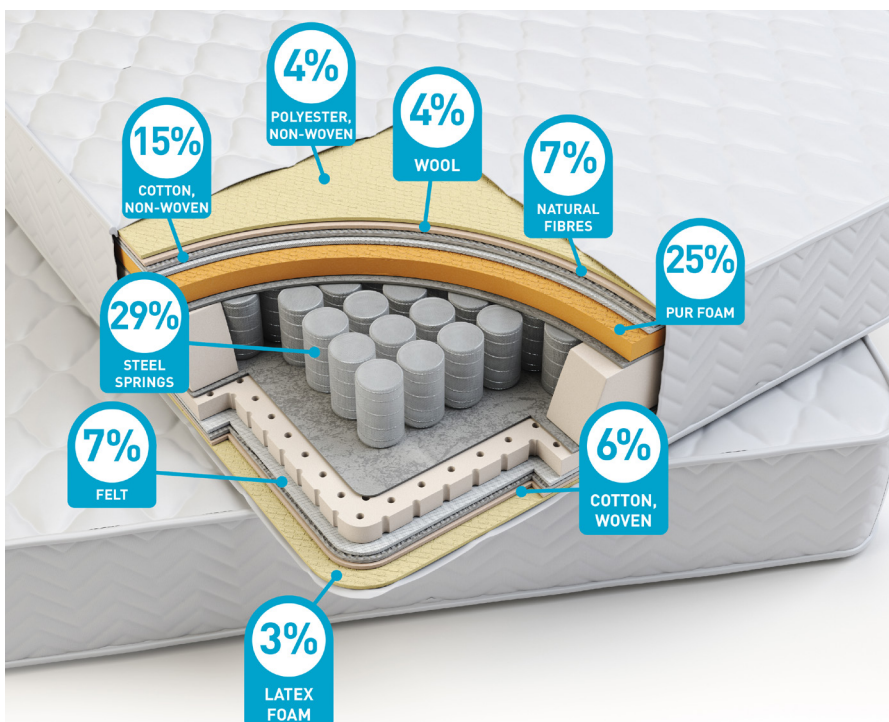
The price volatility of secondary material markets heightens the importance of securing an adequate supply of mattresses in order to make the recycling operation economically viable. Critical viability factors impacted the operation of social enterprise, Springback (based in Fife) – the first ever mattress recycling facility set up in the UK – contributing to its closing down soon after 2004. Conversely, Hamilton Waste & Recycling Ltd, set up in 2018, the one existing mattress recycling facility in Scotland, is providing service to three local authorities and processing in excess of 28,000 mattresses per year.

As reported in the National Bed Federation's most recent consumer survey, the popularity of online sales of mattresses is increasing; and mattresses are being replaced more frequently, with an average lifespan of 7 years. The estimated average carbon footprint of a double mattress is 79kgCO₂e (FIRA, 2011), with the majority of this impact attributable to the use of polyurethane foam and fillings. With only 20% of the estimated 7,000,000 mattresses disposed of in the UK being recycled, developing and adopting circular economy solutions is needed to maximise resource efficiency and to promote responsible consumption.

Down to Business

One example of progress in Scotland is Elite Contract Furniture, based in Glasgow, who have implemented a circular business model. They have established a material supply chain enabling virgin scrap material to be returned to the supplier and recycled into filling materials. In addition, they use recycled clothing to produce comfort layers that are incorporated into their Eco mattress design.

UK-wide, mattress manufacturer Hypnos and the hotel company,



Composition of an average mattress



Premier Inn have been operating a bespoke mattress take-back service for the past 10 years. This service involves Hypnos collecting mattresses from the hotel premises, de-constructing them and recycling recoverable materials and components. During this period, Hypnos has been able to refine its recycling operations, allowing them to process thousands of mattresses annually.

Both of these businesses are members of the National Bed Federation (NBF) and are actively involved in their Circular Economy Committee, which has recently published a [mattress eco-design principles guide](#) for the UK bed sector.

In addition, NBF have [partnered with Zero Waste Scotland](#) on a project aimed at evidencing and designing a mattress extended producer responsibility scheme.



Number of mattresses disposed of in Scotland

With Scotland's proposed ban on biodegradable materials to landfill by 2025, there is great impetus to broaden the reach and effectiveness of circularity in textiles.

Reference: Furniture Industry Research Association (FIRA), (2011), A Study into the

Feasibility of Benchmarking Carbon Footprints of Furniture Products

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The Magic K-Briq

New bricks from old waste

The construction and demolition (C&D) sector is the largest contributor of waste in the UK, generating 120 million tonnes of waste every year. With that in mind, Kenoteq developed the first brick made of over 90% recycled C&D waste - the K-Briq.

Professor Gabriela Medero at Heriot Watt University conceived the idea of the K-Briq more than a decade ago, and has been on a long journey to where she is now with a new company that can produce three million bricks per year.

The K-Briq behaves and looks

just like a fired clay brick but can be manufactured in any desired colour & shape. Instead of utilising finite raw materials like fired clay bricks, the K-Briq, utilises waste that otherwise would end up in landfill. It produces just a tenth of the carbon emissions of a fired clay brick. The 2021 Serpentine Pavilion will showcase its flexibility with numerous shades of pink, grey and black in unique exciting shapes

The K-Briq has been nominated for Product Design of the Year at the Museum of Design in London. 5 of the K-Briqs are in an exhibition there until end of March 2021 and the general public can vote for their favourite until

Prof Gabriela M. Medero, Kenoteq Ltd.



then. You can vote for the K-Briq on the [museum's website](#).

If you would like to specify it in your next project, get creative and talk to the Kenoteq team.

Prof Gabriela M. Medero, Kenoteq Ltd.

info@kenoteq.com



Sisal

Perfect natural insulation

Mike Porteous, The East Africa Sisal Company Ltd

Natural building materials

Our planet has a wealth of natural renewable resources that have potential as sustainable building materials. Plant-based materials are not only selected for their physical structure, but also because they are a low carbon alternative to synthetic fibres as they possess useful properties such as a high strength to weight ratio and moisture buffering. Sisal, a highly sustainable fibre crop, was an important source of strong fibres in the pre-plastics era, and is now finding a role in the development of natural building materials.

Sisal and fibre production

Naturalised and cultivated in tropical countries including Brazil, Kenya and Tanzania, the sisal plant (*Agave sisalana*) is a perennial, drought resistant crop that is increasingly grown organically by small scale farmers to help them cope with climate change. Fibres are extracted through 'decortication' which mechanically separates the fibres from the pulp. The pulp is used as livestock feed while fibres are then dried, brushed, graded and baled for export. They are traditionally made into ropes and sacks however their properties make them well suited for use in natural building products.

Building Materials Application

Sisaltech have supplied chopped fibre to a number of specialist companies who discovered the inclusion of sisal fibres to be a sustainable and effective way of strengthening plaster. Sisaltech was also the first company to use sisal fibre to create insulation products. While other natural fibre insulations exist, the key advantage of sisal is its excellent physical structure. Rather



Sisaltech garage application

than just being used as loft insulation, it can also be used effectively in timber frame construction or between joists under suspended timber floors. It offers installers a safe option in both retrofit or new-build as there is no risk of skin irritation or lung damage. Once in place, moisture buffering qualities help to avoid any timber decay or stone degradation, and there is no risk of harmful chemicals off-gassing.

In addition to making pure sisal insulation, Sisaltech have blended sisal with a wide range of natural fibres such as wool, cotton, flax, jute, and wood fibre in order to develop products with the optimum physical, thermal, acoustic, fire and smoulder performance. With support from Zero Waste Scotland, they have also compared the performance of recycled and circular economy versions of these materials, and are currently using Harris Tweed post-production waste in their blends (with a thermal conductivity of 0.04W/mK).

Batt insulation products are typically bound together using a polyester based bi-component binder which is melted into the fibres. In striving to develop the most sustainable product possible, Sisaltech have developed a plant derived starch-based binder which means all off cuts can be composted.

Looking Forward

Renewable natural resources, if harnessed properly, can be used to design and manufacture high performance building products. The raw materials contain significantly less embodied carbon and a fraction of the energy is required for production when compared to plastic, oil or glass-based equivalents. Using natural materials when constructing new buildings or even restoring old ones will ultimately create a much more sustainable, healthy built environment.

Mike Porteous, The East Africa Sisal Company Ltd ■



Solar Thermal Revival

Solar speakers

Dan Gates, Luths Services Ltd

Recently the newly constituted SEDA-Solar group initiated a series of online seminars. The first of these was on the recent "Revival in Solar Thermal" Oct 2020 (available on the [past events page of the SEDA website](#)).

SEDA-Solar was formed from the old SSEG (Scottish Solar Energy Group) which had been running since 1979, and much of what we are talking about is not new technology. The focus for this event, however, was really about pushing the potential of solar thermal from its conventional contribution to partially offsetting domestic hot water demand, into a much more meaningful (larger) contribution by providing space heating for dwellings (and even for industrial and city-wide heating schemes).

Solar Speakers

The first speaker Dr Richard Hall (Energy Transitions) really did an excellent summary of the policy mishaps and misconceptions leading to structural reasons for the marketplace failure of solar thermal. This is easy to evidence as the UK is currently way down the list of countries even with similar climates. One of the barriers is the lack of space for storage and Richard's phrase of the "tank apocalypse" (removal of hot water cylinders in the push for gas combi-boilers in the 1980/90s) has already entered the lexicon of



Gloria Lo

heating engineers I know. As we move to more renewables, the more storage we can have the better generally and storing energy as water is 1000 times cheaper than storing it in a lithium battery.

The next speaker Stuart Speake (Soltropy) delivered a comprehensive review of the technology types. He is too modest to say it, but the most exciting element (in my opinion) was his own system design which allows 'nonglycol' solutions. Traditionally we added glycol to solar systems to avoid freezing, however, glycol can degrade in high temperatures in summer and can harm the system (clogs it up). This in turn meant engineers would size for small summer loads (to avoid overheating the glycol), but we are now in a new era whereby we can use purely water based systems and thus maximise for much larger winter loads (and contribute to space heating) as summer overheating risks are removed.

The final speaker Brandon Oram (BTSE Heating) joined us from New Zealand and really stole the show (despite it being at 5am for him!) by distilling decades of experience with case study after case study showing all this working in the new 'whole system approach'. Brandon showed us how to integrate thermal panels with various thermal store options to give space heating.

Sometimes we maybe don't need to analyse things endlessly to appreciate what sustainability is. I think there is a growing appreciation of the need to generally 'stop burning stuff' and hopefully free solar thermal energy will be more prominent in the future.

Dan Gates is an Independent Services Engineer with Luths Services Ltd

Future events include Passive Solar design (9th Dec) and come highly recommended. Thanks to Gloria Lo for organising. Booking online: <https://www.seda.uk.net/events> ■



Thoughts from the Chair

A new year for SEDA

Catherine Cosgrove, SEDA

When history looks back on 2020 and the upheaval and changes that have occurred, will this be recognised as the turning point in our fight against climate change? Working at home has become normal, more time spent in gardens & green spaces has re-awakened the need for a connection with nature, health and wellbeing are at the centre of many conversations. None of these things are new to SEDA members but the wider public are discovering the benefits of living a simpler, more environmentally connected life.

What does this mean for SEDA? In one way nothing has changed. Our purpose is still to raise awareness and share information on the value of environmentally responsible design. But in another way, everything has changed. Having no traffic on the roads and no aeroplanes in the sky gave people the chance to experience how life could be if we did commit to a fossil fuel free future. And they liked it. More importantly they don't want to go back to "business as usual" when the pandemic is finally under control. For nearly thirty years SEDA have been telling anyone who will listen that there is another way to create

buildings, landscapes, habitats, processes & services that don't involve using and discarding the earth's precious resources. The difference now is that more people are willing to listen and act. Our challenge now is to help people take the next step in their environmental journey.

Lockdown affected SEDA as much as everyone else. As no one could meet in person, we accelerated hosting on-line events and adding resources to our website. These changes have shown that our audience reach can be much greater. Our online annual conference and AGM this year attracted more attendees than ever, with the benefit that SEDA members from all over the country could take part. Online events won't replace our green drinks nights & seminars but will now be an integral part of our annual programme.

2021 will be a big year for SEDA for two reasons: we celebrate our 30th anniversary and COP26 is coming to Glasgow. Both give us the opportunity to tell people more about our purpose and actions. In the run up to COP26, many people and organisations will be keen to show how environmentally friendly they are. Some of this will be greenwash. At SEDA we have a wide range of experience



Catherine Cosgrove

in environmentally responsible design and we can't be shy about promoting this fact.

To finish I'd like to offer my thanks to David Seel, Chair of SEDA for the last four years. Having worked alongside him for the last year, I have been astonished at the sheer volume of work he has undertaken. He has set a very high standard for the SEDA Directors and it's going to take all of us working together to maintain the momentum he has created.

If you would like to work with SEDA or have any other issues that you think we should cover, please get in touch with any of the Directors, contact us on social media or use the info@seda.uk.net e-mail address. ■



David Seel