

SEDA

# Scotland's Housing Fit For Purpose?

The Scottish Ecological Design Association magazine

*Spring 2020*

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# SEDA

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.

## Editorial team

Nick Domminey, Viktoria Szilvas, and Raina Armstrong

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# Editorial

Sustainable SEDA

*Nick Domminney*



Nick Domminney

Welcome to the first electronic SEDA magazine. Welcome too, if you are thumbing through one of the copies printed for those of you unconnected to the www. Emailing is better environmentally and financially, although perhaps without the charm of an envelope dropping through your letterbox.

In this issue we follow up our Autumn 2019 report on SEDA's "More Than Just Numbers" conference about Scottish housing. This is not just a matter of bricks and mortar, of course. It is about land and planning, who has control of that process and what is produced. Sam Foster explains how the speakers at the Howard Liddell Memorial Lecture dealt with both the process and the product. The "product" will only perform as designed, if it is

built correctly and its inhabitants know how to use it, of course, so Sam's report of Fionn Stevenson's talk about Building Performance Evaluation is particularly apt. Engineer and senior lecturer, Janice Foster, who has undertaken such evaluations of indoor air quality and thermal performance of houses across Scotland, explains her findings. They are astonishing and show how far we have to go.

Upgrading Scotland's 2.5 million homes to a "zero carbon" standard is an enormous but necessary task which is why the recent 'SEDA Guide to Sustainable Renovation', by Chris Morgan of John Gilbert Architects is so important. Chris and his colleague, Barbara Lantschner, outline the guide's intent. Self-build is one solution to housing provision, so we are lucky to have lifelong self-

builder, Duncan Roberts, to update us on his ground-breaking housing project in Hull. Rounding up our housing-related articles, landscape architect, Sheena Raeburn, explains how landscape can absorb CO<sub>2</sub> and enhance residents' lives.

This issue is not all about housing, however. Architecture students tell us why they are demanding courses that deal with the climate crisis. Is there such a thing as sustainable concrete and what are the alternatives? Two structural engineers explain. How about sustainable steel? Reusing it, rather than melting it saves thousands of tonnes of CO<sub>2</sub> emissions. A salvaged-steel supplier tells us how to specify it.

Finally, the Scottish Solar Energy Group (SSEG), set up in 1979 to promote the use of solar energy, has decided to merge with SEDA. Having such an august body as part of the association is an enormous boost to SEDA and, hopefully, SSEG members will enjoy the wide-ranging experience and interests that SEDA can offer. SEDA Chairperson, David Seel and SSEG member, Gloria Lo, explain the background and hopes for the future.

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](mailto:magazine@seda.org) ■

# Scotland's Housing: Fit for Purpose?

Report from Howard Liddell Memorial Lecture

*Sam Foster*

Is Scotland's housing fit for purpose? This was the question posed at SEDA's annual Howard Liddell Memorial Lecture, held at Edinburgh University's Law College on 21st November 2019.

Chaired by Professor Sandy Halliday, and the fifth lecture given in memory of her late husband and SEDA's co-founder Professor Howard Liddell OBE (1945-2013), the evening was used to explore the quality & legacy of Scotland's new and existing housing. It included invaluable contributions from two of the UK's most rigorous housing experts along with succinct summarising & rousing encouragement from one of Scotland's Green MSPs.



Proceedings kicked off with Sandy's talk on American polymath Sherry Arnstein (1930-1997), whose 'Ladder of Citizen Participation' sets out a clear, but rarely-implemented, structure for engendering citizens with power and control over their everyday lives. It illustrated clearly how little meaningful participation and control Scotland's citizens are given – or feel empowered to demand – over crucial elements of public infrastructure such as housing.

Fairfield Housing Cooperative, a former 'sink estate' on the edge of Perth, was presented as an example of successful long-term citizen empowerment and development. Dating back to 1986, and spanning more than fifteen phases to date, the project has included community-led redevelopment of existing buildings, major landscape improvements and a series of energy-efficient & health-focused new-build developments.

In a separate example of the enormous potential of public

participation, the talk included a seven-minute film of a Children's EcoCity project – an initiative from the Children's Parliament that has been deployed across many UK cities. The 2004 film showed children between 7 & 11 years old from Craigmillar in Edinburgh building a 1,500 ft<sup>2</sup> model of their part of the city, discussing and agreeing strategies and then designing how these would look in practice.

Despite nods, platitudes and encouraging comments from city officials, virtually none of the ideas have ever been implemented. The same is true of other Children's EcoCity projects that the Children's Parliament have organised, including one in Dumbiedykes, Edinburgh, in 2006 and another in Dunfermline in 2010. The latter of these was so successful in its holistic approach to people, work, transport, place and ecology that it was invited to be presented at both the Scottish Parliament & at the United Nations' headquarters in Geneva. That its ambitions and ideas have been entirely ignored by the very planners and policy-makers who encouraged them only adds insult to injury.

In her final words Sandy challenged the 100-strong audience to ask 'what if children were in charge of the budget'?

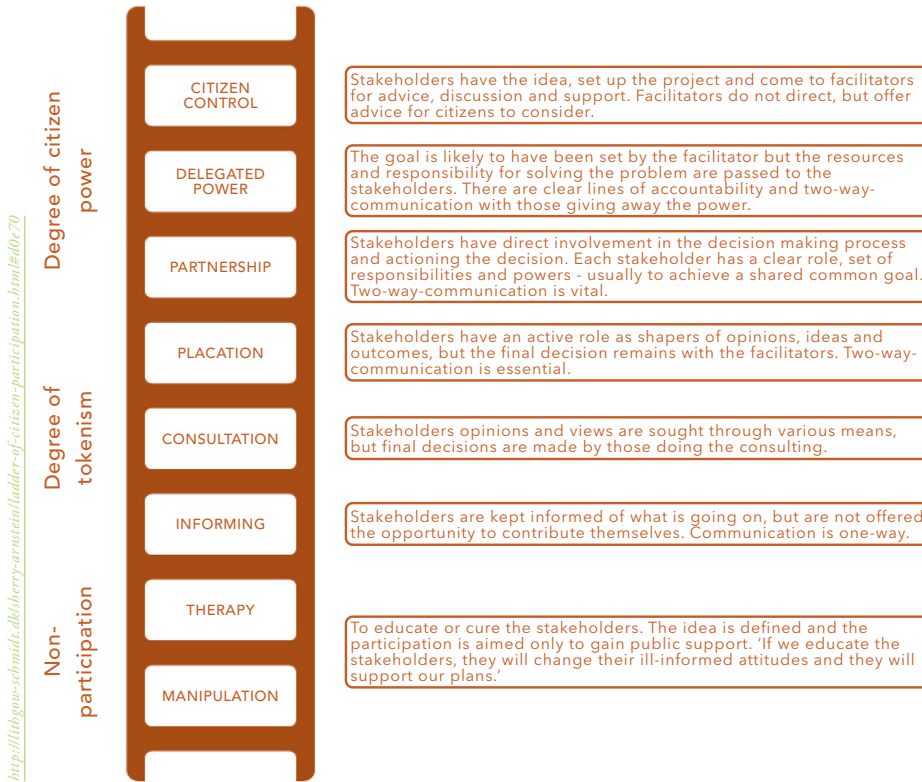
As the children involved in the EcoCity projects reach working age and become planners and policymakers of the future, they must surely question why their ideas – which comprehensively addressed issues of environmental, social & financial importance in imaginative, common sense ways – were not taken on board. We ignore these ideas, and the value of young people's uninhibited thinking, at our peril.

A sense of indignation at political stupidity, commercial greed, inadequate regulation and wilful ignorance of sound research was clearly evident in the evening's second speaker, architect and researcher Professor Stirling Howieson from The University of Strathclyde, whose talk summarised "35 years of wretched research life" in which he felt very little positive change had been made in housing quality. His research into indoor air quality in Scottish homes presented an overwhelmingly bleak picture, peppered with horrifying statistics including nearly nine out of ten social housing tenants in Scotland living in housing that doesn't meet a basic standard introduced ten years ago, and Scotland experiencing 5,000 excess winter deaths each year, many due to cold homes.





A Ladder of Citizen Participation - Sherry R Arnstein



http://litigouschmidt.dk/sherry-arnstein/ladder-of-citizen-participation.html#de70

Slamming the current, poorly-designed volume house-builder-led means of delivering most of Scotland's housing, Stirling linked their typical offering of overheated, stuffy and moist indoor conditions with an increase in dust mite populations and corresponding prevalence of asthma. This was expanded to include chemical off-gassing of compounds including hormone disruptors and oestrogens from an increasing volume and mix of synthetic building materials. Stressing that "toxicity is ubiquitous", his fact-filled talk noted the dramatic collapse of global male fertility in the last 20 years due to chemical exposure, while the risks he and his colleagues were exposed to through research was highlighted through their own increased prevalence of ill-health. Over £300m is spent in the UK every year on so-called 'air fresheners', synthetic mixtures of volatile organic compounds (VOCs) to which many of us are exposed – without our knowledge or consent – in offices,

toilets, schools, universities and public buildings.

Stirling's talk culminated with a call for architects to take the reigns of housing delivery and become the arbiters of this element of public health. He gave a warning that the petrochemical insulation materials used in the cladding of Grenfell Tower risk being "the new asbestos", and stressed the importance of post-occupancy evaluation (POE) and building performance evaluation (BPE). His research paper, 'The Great Scottish Housing Disaster', which explores this and many other connected aspects of housing delivery in Scotland, can be downloaded freely.



Prof. Stirling

After a brief topping-up of glasses the evening's topic was explored in detail by the third speaker, Professor Fionn Stevenson, who expanded on the value and importance of BPE and POE (see SEDA Magazine Issue Summer 2017) – and how the lack of this continues to contribute to an increasing volume of under-performing housing. Using her recently-published book 'Housing Fit for Purpose' Fionn drew on over thirty years of experience as an architect, academic researcher, chair of sustainable design at the University of Sheffield and tutor at several other universities across the UK. Her honesty and integrity, describing seeing her own buildings fail to perform as intended, for example, was invaluable in illustrating the fundamental importance of making sure that occupants are heavily involved in the design, handover and operation of housing.

Understanding that common sense isn't enough to justify BPE and POE, Fionn pointed to an increasing number of industry & national bodies' support for the practice, including the Royal Institute of British Architects, UK Green Building Council & UK Climate Change Committee. Her book is designed to 'plug the gap' in current knowledge around BPE & POE. It is well-placed to do precisely this, offering a clear and straightforward structure to identify issues with completed housing in a quick and cost-effective way, while also setting out methods for further investigation where required.

The reality of most housing is precisely the opposite though: builders and developers sell their profit-centred 'product' to fairly anonymous buyers, providing scant practical handover information, disappearing once the money is paid, and going to great lengths to

*continued on page 04*

*"... firstly, that housing must be seen as a human right and, secondly, that housing is a public good."*

avoid returning to address inevitable defects. However, contrary to popular perception, Fionn pointed out that most volume house-builders have said they value feedback from occupants: they just don't know how to obtain it effectively.

The premise that 'innovation is distracting' was emphatically stressed, and the rise of digital technology and connectivity was presented in fairly positive terms, with Fionn noting the willingness of most occupants to monitor aspects of their own homes. In addition to familiar parameters such as energy use, temperature and humidity, occupants are increasingly recording more complex indoor air quality conditions including VOCs, particulate matter (PM) and carbon dioxide concentrations. The impending move towards an 'Internet of Things' and interconnection between people & digital objects has the potential to give occupants greater levels of information about their surroundings. The real question is how that information can be used to improve those conditions.



The culmination of the evening's talks was left in the direct-speaking hands of Green MSP Andy Wightman, chair of the Scottish Parliament's Cross Party Group on Housing and uncompromising champion of housing rights in Scotland. The scale of change, investment and ambition needed to ensure new and existing housing in Scotland meets targets related to affordability, equity, population change & the climate emergency, was presented as a challenge but not an impossibility. Drawing on his early education as a forester to illustrate how nations can change when there is enough political will, Andy gave the example of Nepal, which transferred its entire forest resource from state-run to community-run in less than ten years.

Housing, he argued, is ultimately about control and power – particularly of land – and the inequality of this. SEDA members will no doubt be aware of Andy Wightman's invaluable contribution to the campaign for Scottish land reform and his books on the subject, including 'Who owns Scotland' and 'The Poor Had No Lawyers'.

He concluded with two key

points: firstly, that housing must be seen as a human right and, secondly, that housing is a public good. On the first he noted that adequate housing was recognized as part of the right to an adequate standard of living in the 1948 Universal Declaration of Human Rights and in the 1966 International Covenant on Economic, Social and Cultural Rights. On the second he highlighted that housing is public infrastructure yet it is privately owned, and questioned why no legal framework exist to resolve a dilemma of such critical relevance to Scotland. His parting shot was a vigorously-cheered call for revolution!

The answer then, from the event?

A resounding NO:  
Scotland's housing is not fit for purpose – but it must become so, and quickly. ■







# Giroscope Self Build

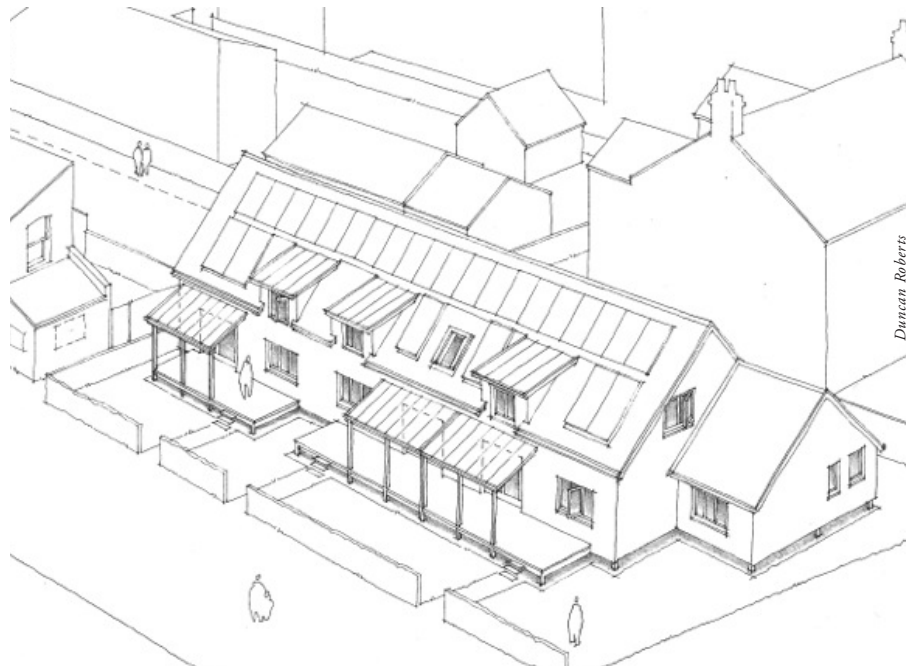
Coltman Street, Hull

*Duncan Roberts*

Giroscope is a charity, established in the 1980's, & based in Hull, East Yorkshire. Its name is derived from the Giro-cheques it's founder members received as unemployment benefit whilst buying their first terraced house, doing it up & then letting it back to themselves. 35 years later Giroscope owns around 120 properties, including, most recently, a church which it uses for markets & festivals. All of the properties have been upgraded using volunteer & trainee labour. Giroscope has worked with a wide range of individuals - including ex-offenders, people on rehabilitation schemes & refugee groups - to help them secure decent accommodation & to get into regular employment.

Having realised the limitations of the types of accommodation that can be provided through the refurbishment of existing terraced housing Giroscope has long had the ambition to build new houses to increase the range of properties available to its tenants. In 2016 it purchased a large detached house in Coltman Street, at the heart of its area of operation, which came with a quarter-acre back garden, accessible directly from the street. The house itself has become Giroscope's office with additional rooms that it lets to other organisations.

The property had previously been owned by Hull City Council & the site was marketed with a development brief for up to eight new properties. Despite this, the original Planning Application for four new houses was rejected



by the City Council's Planning Department on grounds including "over development". The houses - which had been designed around the wishes of prospective tenants - were also deemed too small & with insufficient car parking compared with revised standards adopted by the Council whilst the application was being prepared.

A new scheme of three, slightly larger, houses was drawn up and a successful presentation made to the Planning Committee in advance of the new application being made. A survey of Giroscope's existing tenants showed a car ownership of exactly 1 in 5, with no household having more than one car. This evidence was accepted by the Highways Department in agreeing a new, reduced, car parking provision.

The houses are to be constructed around a post & beam timber frame supported by pad foundations. This

raises the level of the ground floor around 600mm above the existing surface level & this helps deal with the endemic flood risk within Hull. The timber is being supplied by Abbey Timber in the Scottish Borders. Insulation to the walls & roof will be 300mm of Warmcel with sheep's wool in the floor as part of the flood-resilience. The roofs will be covered in tiles manufactured in Hull from Humber clay.

After much discussion the houses will be all-electric with PVs on the roofs to offset demand. The houses will remain in Giroscope's ownership in perpetuity & small private gardens will lead on to a larger shared garden featuring rainwater retention ponds. The gardens will be managed using permaculture principles by Giroscope's gardeners.

Construction of the timber frames began in the first week of March 2020. ■

# What Can Landscape Do

in the face of Climate Emergency?

*Sheena Raeburn*

How can we use the spaces between the buildings, to better reduce emissions and embed carbon\*? - A landscape architect's perspective.

Housing and transportation are inextricably linked, particularly if we think about a place or community rather than a building. The World Health Organisation identifies air pollution as one of the leading causes of premature death (WHO 2018). By planning housing around

connecting school, work, leisure and amenities through emission-free or low emission transportation modes that are safe, convenient and attractive to use, instead of single car use encourages healthier options such as walking or cycling.

This type of planning calls for a major modal shift from the status quo in the UK. But it can, and is being done well, particularly in Northern Europe. This is not just confined to retrofit urban schemes with super-

cycleways in Copenhagen, and from less obvious quarters in Paris with introduction of bike lanes, bike sharing and restrictions on cars, that has seen cycling increase by 54% in just one year, but through large-scale new development as well. [Seestadt, in Vienna](#) is one of the biggest urban developments in Europe. It will eventually provide affordable housing for 20,000 inhabitants, in a green environment, with sustainable mobility, nearby workplaces and a low carbon footprint. ([See also the Home Zone program in the UK Editor](#))

It would be unwise to overlook the importance of protecting existing natural assets when considering new housing development and masterplanning. Mature trees and woodlands are exceptional living entities: purifying the air by sequestering carbon; providing a home for wildlife; reducing temperatures in urban areas; as well as soothing our soul.

The creation of new landscape features and habitats, such as wetlands, meadow, woodland and tree planting add an additional layering of future carbon capture to new developments, as well as positively assist in rainwater management across a site.

Many other landscapes are natural carbon sinks – wetlands, grasslands, oceans and rivers, and peatland blanket bogs, which may only cover 3% of the world's land surface but store at least twice as much carbon as the all of the Earth's forests.

By applying circular economy principles in specification and sourcing sustainable alternatives to





“... planning housing around connecting school, work, leisure and amenities... encourages healthier options.”

Sustainable Housing



Daniel Haneke, aspern Seestadt

concrete and steel, such as timber and hempcrete or lower-carbon cement; reuse and recycling of materials where possible, such as site-won topsoil and subsoil, recycling of stone into aggregate, felled wood into woodchip and mulch, builds value into materials while avoiding the creation of waste to begin with.

By taking an approach that recognises value in protection and enhancement of our natural heritage assets; assures an efficiency in the design

of our external spaces that work hard through providing multiple functions and uses and carefully considers material choices, thereby minimising use of depleting natural resources, must be part of the solution and a way forward in tackling the defining challenge of our times.

*\*Embodied carbon: CO2 emissions arising from the production, procuring and installing materials and components, including the lifetime emissions from maintenance, repair, replacement and ultimately demolition and disposal.* ■



Shaena Raeburn



Barbara Jones on Natural Building

Barbara will be talking on differing straw bale building techniques, using straw bales in load-bearing walls, and cement-free foundations. Q&A will follow.

5 March 2020, 17:30 – 19:30, Glasgow School of Art, 167 Renfrew Street, Glasgow G3 6RQ <https://www.eventbrite.co.uk/e/zero-carbon-building-techniques-tickets-95560396719>

Preparing to Build with Bales

7th March 2020

Designing Your Straw Bale Building

6th March 2020

Understanding Technical Details

24th April 2020

Natural Plasters & Renders

25th April 2020

10:00 - 16:30, Reid Building, 164 Renfrew Street, Glasgow, G3 6RQ £75.00/day (early bird available) To book your place, please email [allan@schoolofnaturalbuilding.co.uk](mailto:allan@schoolofnaturalbuilding.co.uk)

# Experiencing Internal Environments

A housing reality check

Janice Foster

In 2017 MEARU (Mackintosh Environmental Architecture Research Unit) wrote an article for the SEDA magazine describing our work on Building Performance Evaluation (BPE) and Post-Occupancy Evaluation (POE), and setting out how well new dwellings in Scotland were performing in terms of energy efficiency and comfort. The answer, in 2017, was that most buildings tested by MEARU failed to meet their design targets, leading to significant performance gaps and unintended consequences. Major issues included heat loss, discomfort & high energy bills due to issues with design, workmanship and lack of clear handover to occupants.

In 2017 the Mackintosh Environmental Architecture Research Unit (MEARU) wrote an article for the SEDA magazine, describing our work on Building Performance Evaluation (BPE) and Post-Occupancy Evaluation (POE), and setting out how well new dwellings in Scotland were performing in terms of energy efficiency and comfort. The answer, in 2017, was that most buildings tested by MEARU failed to meet their design targets, leading to significant performance gaps and unintended consequences. Major issues included heat loss, discomfort and high energy bills due to issues with design, workmanship and lack of clear handover to occupants.

The good news is that since 2017, there has been a steady increase in interest and uptake of BPE, particularly among the social housing sector. From what MEARU have seen,

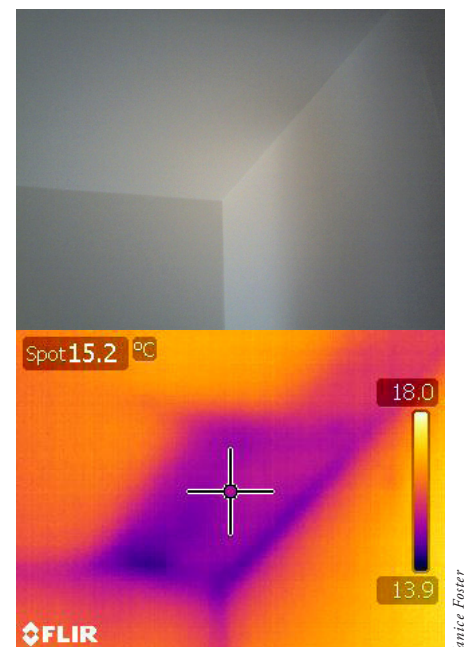


general construction quality has not significantly improved and the same issues identified in 2017's article continue to occur on a frequent basis.

The problem of poor quality of housing remains widespread and MEARU frequently receives enquiries from occupants of new private homes who report poor build quality and negative impacts. As an example, a homeowner in a house in a new development in Glasgow contacted MEARU reporting considerable draughts, discomfort and unexpectedly high space heating costs. Two tests were conducted, the first was air-tightness testing with thermography, this revealed missing or poorly installed insulation in substantial areas of the external walls, creating cold areas on the internal surfaces. Surprisingly the air-tightness test result was 4.18m<sup>3</sup>/h/m<sup>2</sup> @ 50Pa lower than the 5m<sup>3</sup>/h/m<sup>2</sup> @ 50Pa design target. Air leakage tracing identified severe infiltration

originating beneath the window sills, ceiling light fittings and from around the loft hatch. While the overall 'level' of draughts in the house met the design target, the concentration of these in these locations particular locations resulted in significant discomfort.

Secondly, a check of the airflow rates at the recently commissioned mechanical ventilation with heat recovery (MVHR) air terminals indicated vast differences when compared with the commissioning certificate. Of more concern was that the grille in the living room was actually extracting air and not supplying fresh air as intended. The system was imbalanced by 70% causing the house to draw in cold outside air through leakage points, creating a draught across the occupants. The MVHR unit had been replaced twice, due to noise issues and this unit it was undersized, causing an increase in energy consumption. Access to the





*“There is a steep learning process... to reduce the performance gap that exists in dwellings.”*

Sustainable Housing



unit for filter changes required the occupants to crawl under rafters in the loft space!

Following MEARU’s inspection the contractor was called back by the client to rectify the various defects. This involved removal and reinstatement of areas of plasterboard ceilings and walls, leading to significant disruption for the owners. Like the majority of all new housing constructed in Scotland, the house was designed & built to the minimum building regulations of the time – and failed to meet these.

A recent scoping exercise carried out by MEARU identified the need for continuing professional development (CPD) about building performance evaluation among the design community. To achieve this MEARU have been working on projects that aim to transfer BPE knowledge from academia to industry. These include knowledge transfer partnership (KTP) projects with two separate architect’s practices.

The second was with funding assistance from Construction Scotland Innovation Centre (CSIC) and The Gannochy Trust. MEARU’s BPE expertise has been used to help improve the design and specification of 48 new houses near Perth, commissioned by The Gannochy Trust. These homes have recently been completed & MEARU will soon be undertaking comprehensive BPE on these houses. This BPE project is in collaboration with Kingdom Housing Association, who have recently completed the first phase of a large regeneration housing project in Inverkeithing, Fife. The homes in these developments are of similar construction and were built by the same contractor.

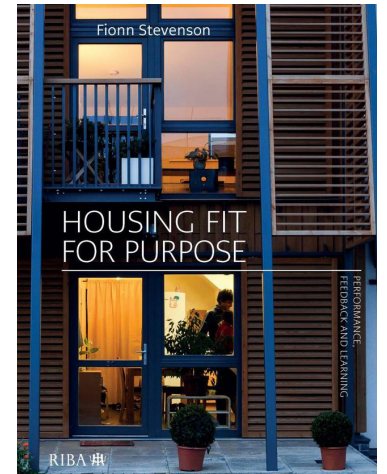
Eight houses from each development will be monitored using identical protocols and outcomes compared. Kingdom Housing Association plan to review the lessons learned in order to improve house designs for homes constructed in later development phases on the regeneration site. The BPE results will be publically available in order that other designers and contractors can learn from these projects.

Extracting the greatest value from this process relies on BPE and POE to be carried out by trained professionals independent of the designer or contractor and with no vested interests.

It is clear that housing will play a large part in helping to achieve Scotland’s proposed net-zero society ambition. There is a steep learning process & action required to reduce the performance gap that exists in dwellings. The question posed in this article is, why wait until legislation forces designers to specify independent BPE? ■



Janice Foster



RIBA Publishing, Fionn Stevenson

We have known for over 10 years now that buildings are not performing as intended. Most people still don’t appreciate this and for that small number who do, it can be a tricky subject to address, so ex-SEDA Chair Professor Fionn Stevenson’s latest book “Housing Fit for Purpose” is an extremely timely and valuable resource.

Fionn covers the background of Building Performance Evaluation (BPE) and the more theoretical context within which it can be seen. She then covers a whole range of more practical issues which for me is where the book comes into its own, packed as it is with useful perspective and pointers gathered from over 10 years experience. If you have any interest in housing, and would like to make sure it does what it’s meant to do, then this book will be useful to you.

- Chris Morgan ■

# Sustainable Renovation Guide

& Report on Pebble Trust's Book, Sustainable Retrofit

*Chris Morgan, Barbara Lantschner & Viktoria Szilvas*

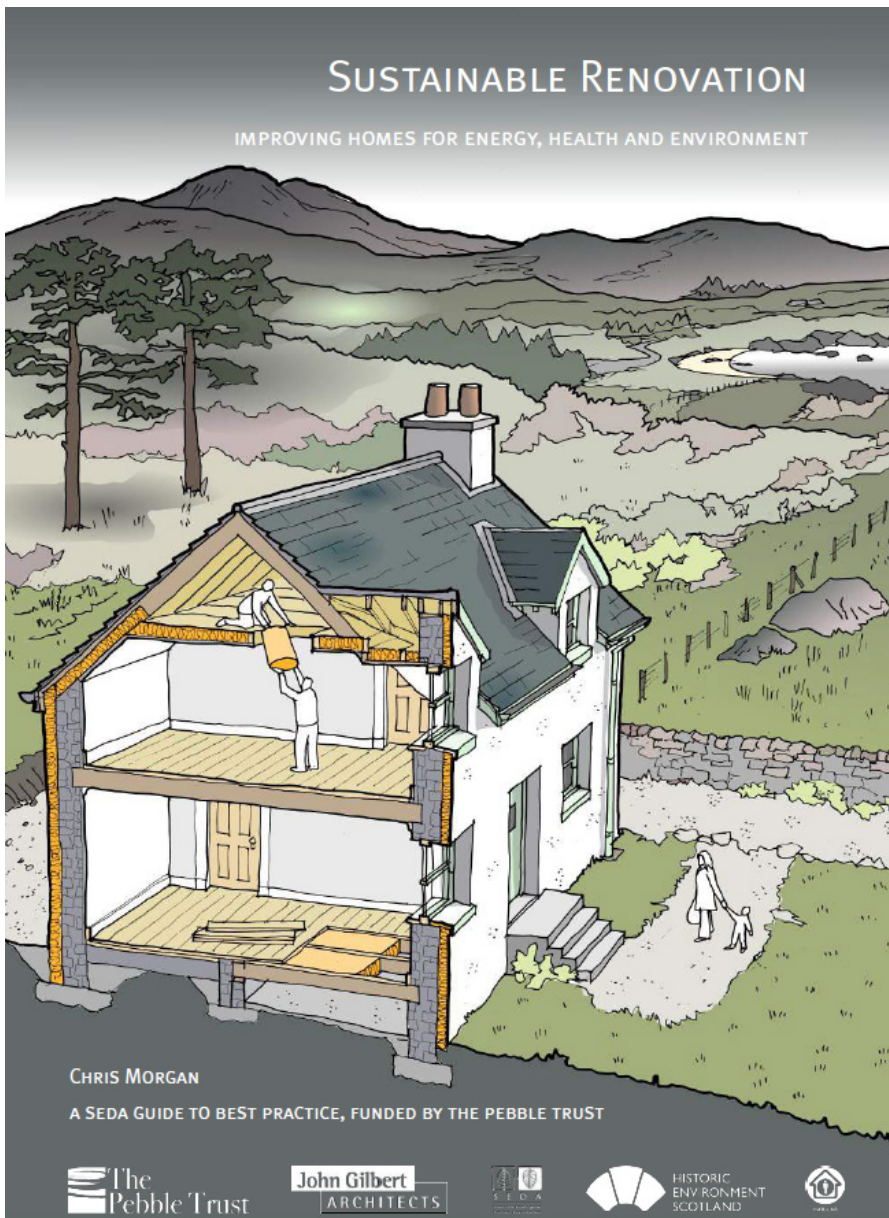
Too often, discussion about upgrading Scotland's existing housing is essentially a discussion about how to improve energy efficiency. This is understandable because if we can achieve this, we can substantially reduce carbon emissions, while reducing fuel poverty - two important goals for Scottish government - but there is so much more to housing than this.

Housing is a subject that touches upon almost every facet of our lives, and some of this breadth is touched upon in other articles in this magazine. This piece focusses on the particular problem of upgrading existing homes and buildings to be consistent with a plausible sustainable future. In conjunction with the Pebble Trust, SEDA published a 'Guide to Sustainable Renovation' which attempts to address this breadth of focus.

There are ten ways in which the Sustainable Renovation Guide differs from the majority of advice currently available.

The guidance:

- 1 seeks a more effective approach to energy efficiency
- 2 takes account of the comfort and health of people who live in buildings
- 3 avoids problems which could lead to building fabric decay and deterioration
- 4 favours details based on real, measured performance, rather than modelled predictions
- 5 highlights the need for more co-ordination and inspection, and for more careful workmanship
- 6 integrates considerations of moisture in buildings
- 7 proposes a much closer level of engagement with people, particularly occupants
- 8 acknowledges the different construction principles and materials found in older buildings
- 9 places value on maintenance and the need to re-integrate this into design
- 10 suggests that the 'significance' of individual buildings be integrated into retrofit assessment.





*"... it isn't true that we can't afford it, its just a question of whether we prioritise it."*

Sustainable Housing



The guide discusses the philosophical and practical issues related to a broader look at housing and then provides a series of quite detailed drawings and specifications for how to upgrade most homes across Scotland.

This balanced approach is crucial, but returning to the subject of energy efficiency, it's worth asking how energy efficient should we be? We don't need to achieve 'zero carbon' but we do need to get close. Most of the heavy lifting needs to be done by the building fabric, but we do have the option of renewables to help us out.

To cut a long story short, I think we need to aim for on average, a 75% cut in energy demand from all existing housing, allowing for most of the residual energy to be supplied by various forms of renewables, preferably in larger scale communal systems for efficiency.

But what does this mean in real numbers? An average home in Scotland uses about 17MWh (megawatt hours). This means we should be aiming for a demand profile of more like 4 or 5 MWh, with most or all of that supplied by renewables.

The EnerPHit standard requires a maximum space heating demand of 25 kWh per square metre. The average area of a home in Scotland is just under 100m<sup>2</sup>, so to heat this we need (100 x 25kWh) which is 2.5MWh a year. Water heating is

currently about 4 MWh on average and can be halved by waste water heat recovery (something we should all be much more interested in!), so that's 2 MWh, and we still need to address electricity which is about 2.5 MWh annually per home. Electricity consumption is currently rising and much harder to change because it is more reliant on behaviour change, but let's say that with some effort, we can all reduce this to 1.5 MWh annually and you have a 'new' total of 6 MWh. Not quite the 4 or 5 MWh, but close, and as long as we can provide that demand renewably we might be OK.

So, we need to aim at somewhere close to the EnerPHit standard for most buildings. This is the passivhaus standard applied to existing buildings. This standard is much harder to achieve than any conventional target so will require hard work and skill, and in addition we need to allow for the fact that some buildings - particularly some historical buildings - genuinely cannot be brought up to this standard, so all the more reason to aim high for those that can.

What about the costs of this work? There are many figures doing the rounds. Those with relatively little experience tend to think that a house can be effectively upgraded for perhaps £6,000, plus or minus a bit. Those who have been grappling with the question for several years are now routinely talking of anything between £20k and £60k. There are so many

variables that in this short piece it is pointless to try and cover them but with a fair wind and some economies of scale, I think its reasonable to consider £25k as a plausible figure for most properties.

There are 2.5 million homes in Scotland, so the total cost of this work would be around £60 billion. Obviously this is expensive, but the scale of the problem appears to require it, and there is absolutely no doubt that it is less expensive, ultimately, than not doing it.

Its worth trying to maintain perspective. Councils and Housing Associations think little of spending £10 - 15k per property on a new kitchen and bathroom, and perhaps new windows. The cost of providing a new social rented property is around £140k, but in many areas, older buildings are being demolished to make room for new ones, whereas even at £60k per unit, the old ones could be upgraded to the same standard for less than half.

£60 billion is a lot, but the cost of HS2 is reportedly to be around £105 billion, while the UK government subsidises fossil fuels to the tune of £10 billion each year, and it pales into insignificance when compared to the £500 billion rescue package prepared for the UK banks in 2008. In short, it isn't true that we can't afford it, its just a question of whether we prioritise it. I can think of few things more worthwhile. ■

## Green Drinks Edinburgh



Repurposed Theatre

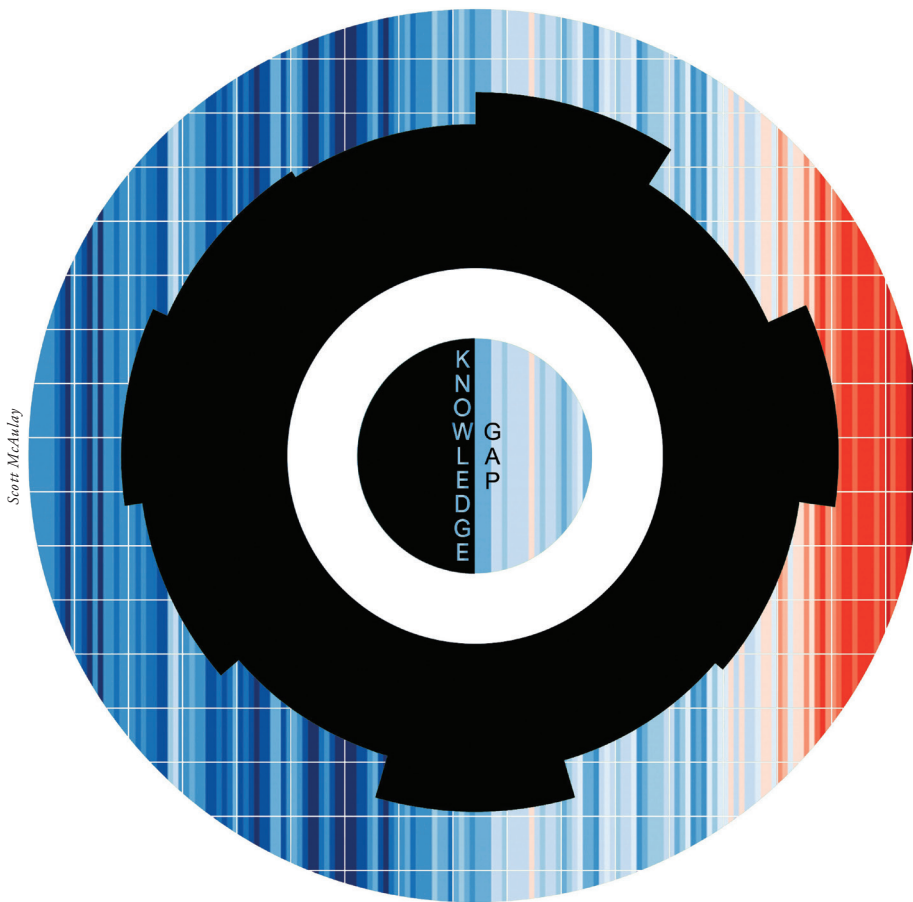
In the build-up to Edinburgh Festival this Green Drinks focuses on 'recycled' arts venues. This may have been achieved by converting old buildings or making temporary structures out of recycled materials. There is also an emphasis on community buildings, with the event being held at Bellfield community hub - the converted Portobello Old Parish Church - which is halfway through an ambitious building project.

6pm for 6.30-8.30pm on Thursday 9th April  
Bellfield, Portobello

# Architecture School

Preparing students for a new type of architecture

*Scott McAulay & Viktoria Szilvas*



Scott McAulay

## CRISIS STUDIO

As the Climate Crisis has been driven to the forefront of public conscience by activists around the world, its historic, intentional empty-chairing from the modern education received by architects is beginning to take flak - from educators, practitioners and most significantly, from the students receiving it - and that heat is rising. If future practitioners are not equipped with the fundamentals of Climate Literacy and the skills necessary to deliver a Zero Carbon Built Environment whilst they are in university, it shall only exacerbate chasm-like knowledge gaps that exist in the profession.

Over the past six months through the [Anthropocene Architecture School \(AAS\)](#) – the alternative school of activism, architecture and climate literacy that I coordinate -, I have been cultivating the enthusiasms

of students: emboldening them to challenge architecture schools' "business-as-usual" approach, and facilitating the passing-on of knowledge that they so desperately require during this Climate and

Ecological Emergency. The AAS launched during 2019's Architecture Fringe on the provocation that a contemporary architectural education – as delivered in academia and supported by CPD - is no longer fit for purpose in the context of Climate Breakdown. This was inspired by my own educational experience which lacked any meaningful mention of climate change or an ecological component, except for when brought up by students. Despite support from indisputable data quantifying these students' understanding of sustainability beyond basic concepts, they were optimistically rewarded 59% (McAulay, 2019). Should this continue into practice, as I hypothesized it would, then I had identified a disconcerting knowledge gap in education that has not been preparing the professionals of today to cope with a Climate Emergency for decades.

The Crisis Studio - an evening of tutorials delivered by a multidisciplinary tutor team to pass on sustainable design skills, illustrates this growing student eagerness to learn - particularly what they are not receiving enough of. At the first event in Glasgow in November 2019, 47 students attended an incredible 40 one-to-one tutorials and an excess of a dozen pin-up reviews, two weeks before their finals. After speaking with a Retrofit Coordinator about his project, one student happily exclaimed, "I just learnt more in 15 minutes about technology than I did in two-and-a-half years!" Several others eagerly enquired about similar future events. At the same time,





*Crisis workshop at the Glasgow Society*

tutors raised concerns that “the students’ lack of understanding of basic ecological design principles was horrifying,” with an average projected level of understanding sitting around 30% (McAulay 2020). In response to this demand, and to encourage more students to collectively address this urgent need, the Crisis Studio shall be rolling out to Dundee and Edinburgh in coming months alongside Glasgow’s.

Around the U.K., this trend continues: compared to 830 signatories of Architects Declare, there are 2150 signatories of Architecture Education Declares – mirroring the Youth Strike for Climate’s struggle against an older generation holding positions of power. Whilst delivering one of four provocations at ESALA Declares’ launch in September, the room was at capacity and their student population’s call for a more Climate Aware curriculum is still building in volume – encouragingly, not solely from soon-to-be-graduates or alumni. On top of this, there will be the [Earth Summit at Birmingham School of Design in March](#) – pulling

together those acting as opposed to declaring as a publicity exercise, which I shall be attending and running a workshop in line with one of their themes: “Radical Pedagogy”.

Something to watch out for are students at the Mackintosh School of Architecture, under the moniker of Reset Architecture– spearheaded by a core group of Second Years, who are working towards holding their own conference in March, to focus Scottish efforts and to catalyse the learning they need. Being asked by students, months after graduating, if I would help them in supporting this event and amplifying their search for participants was both humbling and uplifting, and I strongly believe SEDA and its members should get behind this in our entirety. SEDA is, to me, a community creating a space for those of us with a passion for ecological design and it has supported me at moments when I was not receiving this support from my school of architecture; and this is what it can and should be for this next wave of students. If we cannot strike for the climate or commit acts

of civil disobedience; supporting them by sharing our sustainable design skills, sponsoring their events and cultivating their enthusiasm for ecological design is the very least we can do to uplift a future generation – and if personally, you can block roads or go on strike, even better, do both!

The Climate Crisis necessitates a new architectural education – not the one that failed to equip us with ecological design skills drowned in greenwash, but one that scraps ‘business-as-usual’ and leaves it behind entirely. Seeing the beginning of this groundswell in student-driven endeavours for meaningful change, supported by academics occasionally, is truly an antidote to the building of climate anxiety and grief that, thanks to Extinction Rebellion and the Youth Strikers, has become that much easier for us to voice in recent months. As Marcus Ford so eloquently concludes in *Rethinking the Modern University*: “so long as we educate young people into modern ways of thinking, we will continue to perpetuate the very civilization that is destroying the planet” and as climate projections cite 2020 as the critical year – and with COP26 coming to Glasgow, we must begin to educate anew for the Anthropocene: ecologically, radically and urgently.

#### Sources:

Ford, M (2019). *Rethinking the Modern University*. Available [here](#) Last accessed 13th Jan 2020

McAulay, S (2020). *Crisis Studio 01: Educational Troubleshooting and Feedback*. Scotland: *The Anthropocene Architecture School*. Available upon request.

McAulay, S (2019). *Student Understanding of Sustainability in the Built Environment*. Scotland: *The Anthropocene Architecture School*. Available upon request.







## MOCT &amp; Gaia Education



Evanus Mangwende

One of the organisations aiming to bridge the gap in sustainability education is **Gaia Education**. Their 4-week long Ecovillage Design Education program, based in a sustainable settlement to provide knowledge and practical skills, sets out to 'design a society which uses energy & materials with greater efficiency, distributes wealth fairly and strives to eliminate the concept of waste'.

The online version of this course, which I participated in, is based on the same 4 dimensions (Social, Worldview, Ecological and Economic) each explored

over an 8-week period with online discussions. The course finishes with a 12-week design studio report on a 'live' project. Our group worked with the **Mangwende Orphan Care Trust**, helping to design a Permaculture Education Centre with this holistic approach in mind, to help the local, rural community become more resilient & provide an example that can be replicated in other regions, too\*.

\*<https://www.gaiaeducation.org/learning/case-studies/mangwende-orphan-care-trust/>

## RE\_ACTION DAY

PechaKucha presentations showcasing the best of Scottish Students' Sustainability

Hosted by Reset Architecture & the Mackintosh School of Architecture, Glasgow School of Art and in collaboration with the Anthropocene Architecture School, GSA Sustainability Group, Collective Architecture and many more, Re\_Action Day aims to bring students, practicing architects and educators together for a day of talks, workshops, discussions and debates to address the knowledge gap currently facing both staff and students, giving them the tools to begin tackling the climate crisis.

21<sup>st</sup> March, at the Reid Auditorium, 09:30 - 17:00

Refreshments will be provided throughout the day, including a vegan lunch. ■

<https://www.eventbrite.co.uk/e/re-action-day-tickets-90928165591>

Reset Architecture Presents

RE\_ACTION DAY

Calling all Students, Tutors, Practitioners. We have not been equipped with the skills needed to take on the Climate Crisis. Come together with 5 Scottish schools of architecture for a day of workshops, talks and debates. Lets tackle this together.

Reset Architecture, GSA, AS, GIA, AN





# Salvage Not Scrap

Re-use of Steel in Construction

Roy Fishwick

Steel Re Use is already well established in certain areas of construction. The piling industry, for example, has long been aware of the advantages. Many buildings around Glasgow rest on salvaged steel piles. Cleveland Steel and Tubes Ltd has 70,000T of pipes available and sells in excess of 12,000T per year, often supplied as finished items, including universal steel sections.

A percentage of all steel is already recycled. Recycling or reforming steel saves approx. 1700kg of CO2/Tonne. But reusing salvaged steel can save up to 2600Kg of CO2/Tonne; a potential 96% saving for CO2e versus new and up to 30% for recycling.

Specifying the material is key to getting what you want. As the market is not fully developed, however, it will always assist if you specify the steel by its performance requirements (strength, yield etc) rather than just by size and grade. If using modern grades, specify them “or equivalent”. Flexibility is key to getting reuse; using what is available rather than restricting yourself to that which you have specified only to find it is unavailable when you need it. There are now materials available on the open market, however,



Roy Fishwick

and this sector is set to grow.

One of the biggest perceived barriers is legislation, specifically CE marking. But this is not a problem. CE marking is controlled by the Construction Product Regulations which specifically allow for sustainability and reuse. The CE regulation for steel is EN 1090. Although this is intended for modern grades and standards of CE marked materials, it does also allow for alternatives. These have to be proved fit for purpose. This is pretty straight forward for non-fatigue applications.

steels properties do not degrade although its condition might. This means that with some basic material tests your supplier can prove its mechanical properties and hence its fitness for purpose. The supplier can then apply a CE mark to the finished material as required by law.

All of this has been recently formalized in the Steel Construction Institutes “Steel Reuse Protocol” which is available free online or hard copies available from Cleveland Steel and Tubes Ltd. ■

Traditional Roof Leadwork  
Surveying & Maintenance  
Techniques

with Alasdair White,  
John Fulton Plumbers Ltd.

12:30-1:30pm  
Tuesday 17th March 2020

Conservation Stonework &  
Selecting the Right Stone

Marcus Paine Graeme Haddon,  
Hutton Stone Quarry

12:30-1:30pm  
Tuesday 21st April 2020



Glasgow City Heritage Trust  
54 Bell Street, Glasgow G1 1LQ

Flat Roofing  
Maintenance Awareness  
& Repair Issues

with George Brolly,  
Geo. Brolly & Co Roofing

12:30-1:30pm  
21st May 2020

# Concrete Foundations & Floors

## Sustainable Alternatives Explored

Stephen Farrar & Ruth Crewe

Concrete is cheap, strong, does not readily decay or combust, and is readily mouldable. It is therefore extremely useful. It, however, contributes hugely to global warming, and is estimated to contribute about 8% of global Greenhouse Gas Emissions. Reinforcing steel added to concrete may drastically increase its GWP (Global Warming Potential). Concrete cannot be made carbon neutral, even using fuel from renewable resources, without carbon capture & storage (CCS) technology. No cement plant in the world currently uses this technology, although one plant in Norway is planned.

### Lime:

Lime is almost as energy intensive to produce as cement. Although during its lifetime it may reabsorb some CO<sub>2</sub>, it should not automatically be seen as a 'low carbon alternative'. Unlike cement it may need to be transported over long distances. Scotland has one Blue Circle cement works in Dunbar, whilst Lime is imported from France and Germany. Dunbar currently burns waste derived fuels, such as car tyres, sewage pellets, and paper, plastic & cardboard that aren't recycled. Mortar using pure lime is ideal for 'mass masonry', and stone may be reclaimed and reused due to the relative weakness of lime mortar. Lime mixed with 'pozzollans' produces a stronger lime that sets under water (hydraulic lime). Pozzollans include materials of volcanic origin, some diatomaceous earths,

Stone type	UK Cradle-to-site* (kgCO <sub>2</sub> e/tonne)	Cradle-to-Site from countries indicated			
		Spain	Poland	India	China
Sandstone	77.3	133.7		312.3	504.0
Granite	158.0	16.2	188.0	336.5	415.5
Slate	297.4	318.2			568.1

\* These figures are based on UK cradle-to-gate plus transport to development sites in Edinburgh and Aberdeen.

and artificial materials including fly ash, burned clays, & shales. The environmental impact of hydraulic limes may be considered similar to or slightly more than pure lime.

### 'Low Carbon' Cements:

Cement replacements such as ggbs, fly ash and silica may be used to reduce GWP, but as these are byproducts of other energy intensive industries such as coal burning and steel manufacture, they do not represent good long-term alternatives & may not be locally available. 'Geopolymer' cements rely on similar byproducts.

### Stonework:

The GWP of extracting, processing and transporting stone is highly variable and is usually greater than plain concrete (especially if stone is imported from China). If from a local quarry or from recycled stone, it may be very low. Combined with the use of thin jointed lime mortar or weak cement mortar with kilns fired using fuel from renewable sources etc., stone may be considered to have a low carbon footprint. Additional strength may be added to stonework by using reinforcement. Masonry has fallen out of favour as it is slow and labour intensive. The use of recycled & locally extracted masonry also represents issues of quality assurance.

### Other Materials:

Car tyres have been used for foundations & retaining walls although as rubber degrades and steel reinforcing wires corrode, a shorter working life may be expected. Timber piles have been used successfully in Venice mud and, where deprived of oxygen, they do not readily rot.

Care must be taken when using novel or recycled materials to ensure they meet industry standards & do not present future risks for the client or mortgage company. Engineers often don't have sufficient information regarding their strength, durability & variability. Testing on small samples can be expensive and some engineers & architects may ignore the risk, guess, use previous experience, or use conservative values which aren't generally satisfactory. Building with care is expensive and until the true ecological cost of using a product is reflected in its pricing, it makes it difficult to choose those with the lowest environmental impact.

-Stephen Farrar

Table 7. Embodied carbon associated with common construction materials (adapted from Hammond & Jones, 2008b)

Material	Embodied Carbon (kgCO <sub>2</sub> /tonne)	Source
Sandstone	64	This work
Granite	93	
Marble	112	Hammond, Jones
General Concrete	130	
Cement Mortar (1:2:9 cement-lime-sand mix) (1)	143	
General Clay Bricks	220	This work
Slate	232	
Timber: Sawn Softwood	450	Hammond, Jones
Timber: Sawn Hardwood	470	
Facing Bricks	520	
General Building Cement	830	
Steel: Bar & Rod (2)	1710	
Steel: Galvanised sheet (3)	2820	

All figures are for cradle-to-gate, (1) This is the closest mortar to those used for traditional stone listed in the inventory, (2) Typical values, (3) Primary steel





Stone type	Embodied Carbon (kgCO <sub>2</sub> e/tonne)	
	Cradle-to-gate	Cradle-to-site
Sandstone	64.0	77.4
Granite	92.9	107.5
Slate	232.0	251.8

*Climate change: The massive CO<sub>2</sub> emitter you may not know about - Lucy Rodgers,*

*CCS at Norcem Brevik: Background, Energy & Carbon Reduction - Tarmac*

*Embodied energy and CO<sub>2</sub> in UK dimension stone - N. Krishna\*, P.F.G. Banfill\*\*S. Goodsir\*,*

*\*SISTech Ltd, Heriot-Watt University, Edinburgh, EH14 4AS, \*\*School of the Built Environment, Heriot-Watt University, Edinburgh, EH14 4AS*

Specifying sustainable concrete is a simple area where Engineers and Contractors can eliminate tonnes of embodied CO<sub>2</sub> in a building scheme by changing two lines in a specification. Reducing the cement content of concrete offers various performance benefits with the only minor downside being slightly prolonged curing time.

Sustainable concrete grades are already routinely being specified by large engineering consultancies across all structural elements: piles, pads, beams, slabs, columns and shear cores. It is hoped that this article gives readers confidence to explore this option on their next scheme.

The go-to resource on this subject, for Engineers and Architects alike, is the Concrete Centre’s publication “Specifying Sustainable Concrete”. The 2019 edition is available to download free from their website\*. This guidance is 24 pages long and packed with practical advice for Engineers and Architects in equal measures. The following two main areas are where Engineers can influence the sustainability performance of concrete:

**Use of Recycled Aggregate  
Marginal CO<sub>2</sub> reduction can be achieved here.**

- The key message is: do not over-specify the use of recycled aggregate, but permit it from within a 15km radius. The embodied CO<sub>2</sub> involved in bringing recycled aggregate to a site from further than a 15km radius exceeds the benefits. See Table 3 reproduced below.
- Go for 20mm instead of 10mm aggregate size unless there is a reason not to, because it requires less cement to achieve the same strength grade.
- The guidance highlights a flaw in the BRE Green Guide, which incentivises the use of recycled content, without due regard to its availability. It suggests discussion with the client and BRE project assessor to prevent unfair penalisation for opting not to specify recycled aggregate.

**Substituting a % of OPC  
with Something Greener**

**Substantial CO<sub>2</sub> reduction can be achieved here.**

The cementitious component of concrete represents the majority of its embodied CO<sub>2</sub>. Ordinary Portland Cement (OPC) production is currently estimated to account for 5% of all global CO<sub>2</sub> emissions. Engineers can choose a cement grade other than CEM I, the default cement grade, which is 100% OPC. Other cement grades and their compositions are listed in table 6 below, along with their embodied CO<sub>2</sub> content per tonne:

Note that the embodied carbon of cement substitutes will increase slightly from quoted values, depending upon haulage distance from the producer.

RIAS Sustainability Working Group  
Architectural Education Workshop  
1.00pm, 10th March 2020  
RIAS, Rutland Square, Edinburgh

Cement <sup>a</sup>	Combination <sup>b</sup>	Secondary Main Constituent (smc) or Addition Low-High Content %	Embodied CO <sub>2</sub> smc Content Low-High, kg CO <sub>2</sub> /tonne
CEM I Portland cement			913
CEM II/A-LL or L Portland limestone cement	CI/A-LL or L	limestone 6 - 20	859 - 745
CEM II/A-V Portland fly ash cement	CI/A-V	fly ash 6 - 20	858 - 746
CEM II/B-V Portland fly ash cement	CI/B-V	fly ash 21 - 35	722 - 615
CEM II/B-S Portland slag cement	CI/B-S	ggbs 21 - 35	735 - 639
CEM III/A Blastfurnace cement	CI/IIA	ggbs 36 - 65	622 - 363
CEM III/B Blastfurnace cement	CI/IIIB	ggbs 66 - 80	381 - 326
CEM IV/B-V Siliceous fly ash cement	CI/IV-B-V	fly ash 36 - 55	598 - 413

MPA - Specifying Sustainable Concrete

**Practical considerations for the Engineer:**

- The amount of cement you decide to replace with either GGBS or fly ash can depend on programme constraints because the higher % substitution, the longer the concrete will take to cure. Therefore hold a discussion with the Contractor at an early stage to check they can accept say a ~30% increase in time to strike formwork
- For the same reason, the concrete specification should make provision for additional cubes to be taken, to be crushed at 56 days, plus some intermediate intervals, if the Contractor intends to load the concrete element earlier (i.e. backfilling a retaining wall)
- Cost: GGBS is generally slightly cheaper than OPC in a like-for-like comparison, however the specific cost for each project will depend on haulage distances

*continued on p. 20*



*“Building with care is expensive and until the true ecological cost of using a product is reflected in its pricing...”*

Considerations for the Architect:

- GGBS is off-white in colour and results in a lighter shade of finished concrete
- Concrete has a better finish due to fine particles of GGBS

Future supply & demand issues for cement substitutes:

- There are currently 2 blast furnace steel works in the UK (Scunthorpe and Port Talbot).
- There is significant availability of raw material to produce GGBS within Europe
- UK concrete producers will also import the raw material from the

Far East and this still represents a substantial CO2 reduction compared with locally produced cement

- It is envisaged, in future other industrial processes with by-products, that can be turned into usable cement, acting as substitutes will be exploited further

Responsible specifying of concrete is the realm of Civil and Structural Engineers. Whatever other green lifestyle choices an individual can introduce in their day-to-day routine are insignificant compared with the change brought about by slightly tweaking the concrete specification of a scheme. ■

*-Ruth Crewe, MStructE*

Material & delivery distance	kg CO <sub>2</sub> / tonne	Cradle to gate kg CO <sub>2</sub> / tonne	Transport kg CO <sub>2</sub> / tonne	Total kg CO <sub>2</sub> / tonne	+/- % CO <sub>2</sub>
<b>Virgin aggregates</b>					
+58.5km (delivery & return distance by road)	6.6	2.7	9.3	-	
<b>Recycled C&amp;D aggregates compared to the use of virgin aggregates</b>					
0 km transport (used on-site)	7.9	0	7.9	-15%	
+5 km (delivery distance by road)	7.9	0.5	8.4	-10%	
+10 km (delivery distance by road)	7.9	0.9	8.8	-5%	
+15 km (delivery distance by road)	7.9	1.4	9.3	0%	
+20 km (delivery distance by road)	7.9	1.8	9.7	5%	
+58.5 km (delivery & return distance by road)	7.9	2.7	10.6	14%	
*C&D - Construction & Demolition					

<https://www.concretecentre.com/Publications-Software/Publications/Specifying-Sustainable-Concrete.aspx>

MPA - Specifying Sustainable Concrete 2019



# EARTH SUMMIT

MATERIAL PRACTICES

SUSTAINABLE PLACES

PROFESSIONAL ACTIVISM



SCAN FOR TICKETS

Birmingham School of Architecture & Design  
Climate Action Group

### Day 1 Practice Workshops

Workshops exploring skills, knowledge & education for practitioners; design workshops; exemplary case studies; & round table discussions across 4 themes: Sustainable Living, Material Practices, Professional Activism & Systems Thinking.

### Day 2 Sustainable Places

Keynote lectures & workshops delivered by leading practitioners & academics on flood adaptive strategies, foodscapes, net gain & nature based solutions, and landscape & wellbeing. The event aims to create a forum for discussion & provides a platform for showcasing projects, case studies & future practice in landscape design for a changing climate

Staff & students collaborating to ensure we address the climate challenge head on. Join us to explore how we embed climate action throughout the School, the University, the City, the Professions and beyond.

25th-26th March 2020  
BCU Parkside Building - The Shell  
5 Curzon Street, Birmingham  
£30/day or £50 for two.





# Bridgend Bothy

## Progress Report & Lessons Learned

*Duncan Roberts & Simon Hackin*

A few years ago the theme of the SEDA Annual Meeting was "Product or Process?" and the Bothy project - currently underway at community-run Bridgend Farmhouse in Edinburgh, is a classic example of how the emphasis can shift between these two poles during the development of even the most modest of buildings.

The origins of the Bridgend Bothy project are lost in the mists of SEDA history but sterling work was undertaken, on a pro-bono basis, by SEDA members to obtain Planning & Building Control Approval for the Bothy and aspects of the training were lined up. Funds were secured to pay for the required archaeological investigations on the site as the ground was broken for the foundations.

From this stage on the input of volunteers has been key. A wide range of people - BIG staff and community participants, SEDA members, plus students from Edinburgh School of Architecture - pitched in to undertake the strenuous digging and filling of the foundations. Supervision has rested principally on Simon Hackin - an Edinburgh-based woodworker & trainer. Early in 2019 timber was ordered from Abbey Timber and in a week in May the structural frame was assembled by a team of eight volunteers with a crowd of 20 more joining in for the frame-raising (see pic).

The roof structure followed swiftly, which, once the butyl membrane was in place, enabled the straw bales to be delivered to site & stored under cover.

Over the last eight months progress has been steady - strawbale external walls



*Simon Hackin*

were constructed under the supervision of Emma Appleton from Machynlleth in Wales, then lime-rendered externally under Arthur Phillip's supervision from Shropshire. The internal clay plaster was initiated by Fife's own Becky Little.

Now the infill panels are formed between the strawbale walls' tops and the roof structure, followed by roof & floor insulation.

The range of participants taking part in the building work has been astonishing, becoming a melting pot of European and wider nationalities, turning up regularly on the weekends to take pleasure in creating something

tangible, over half of them were women, mostly without previous building experience. Showing an example of how Process can become more important than Product.

The simple arithmetic suggests that, by working perhaps two or three days a month, the volunteer input only represents around 10% of the time that a conventional contractor might give to a project. The implication being that the Bothy will take ten times longer to complete than a similar building might take.

Whether this was ever factored in at the start of the project is unclear, & the achievements to date should be justly celebrated, and the dedication and passion of those involved fully acknowledged. But it needs to be admitted that delivering community projects by these means will not be quick and may not even be cheap.

**But they can - as the Bothy has proved - be good for all concerned. ■**



*Duncan Roberts*

*“SEDA Solar will... work with SEDA's research remit, but feed into... policy & knowledge sharing / publications.”*

# SEDA Solar

Scottish Solar Energy Group Finding a New Home in SEDA

*Gloria Lo & David Seel*

SEDA members who have been involved with design or research into solar design in architecture, passive, electrical and mechanical, will no doubt have been aware of, or worked with, the Scottish Solar Energy Group SSEG. Since 1979, SSEG have promoted the use of solar in Scotland as a means of reducing national reliance upon fossil-based fuels, whilst enhancing the health and comfort within internal working and living environments. You may have attended their seminars, lectures and conferences, which brought many of the best experts in different fields and backgrounds to Scotland and showed off the best solar projects with visits organised, both locally and abroad.

Founded by prominent figures in the solar field including Kerr MacGregor (mechanical engineer and inventor), Roger Talbot (engineer) and John Wilson (physicist working on early PVs). Solar conferences in early 80's attracted long term supporters which included Gurdev Saluja (engineer by training, teaching in architecture school at Scott Sutherland), Colin Porteous (professor in architecture GSA MEARU), Lyle Schnadt, George Goudsmit (Directors of AES Solar) and Jim Norris (Director of Solar Energy Systems). Later, as SSEG grew, notable members that SEDA may know of included John Gilbert (architect), Stas Burek (engineer, senior lecturer at GCU) and Rosalie



*Gloria Lo*

Menon (senior lecturer at GSA MEARU).

This gives a flavour of the diversity of SSEG that it embraced a wide range of members and audience in academia/research, in engineering and design, in professional practice and commercial sector of the solar arena in Scotland. Over the years, SSEG have influenced local thinking, legislation and knowledge transfer in industry.

In spite of all this good work, it has proven harder in recent years to find people to run it as a body in its own right, so at the AGM last year, the SSEG decided to wrap up the organisation. It so happens that Chairman Gloria Lo, Colin Porteous, David Sommervell and John Gilbert are all SEDA members, who knew what the organisation stands for. Further to discussion during the AGM, it was deemed most appropriate and befitting that SEDA

should be approached for some form of merger, and perhaps some of the solar activities could continue under SEDA's auspices.

This was agreed in principle as something both organisations would want to do. Not only does it fit very well into sustainable design agenda that SEDA is already involved in, but would also strengthen connections on research, and give members access to the considerable knowledge and expertise that the SSEG have built up over the years. A new dimension in connection to industry and specifically informally through members with Solar Trade Association.

So over the next few months, we intend to set up SEDA Solar, as a group who will carry on this work but within the wider design organisation. SEDA Solar will principally work with SEDA's research remit, but feed into other





areas of policy and knowledge sharing / publications. SEDA will be strengthened by adopting all SSEG members straight away, which is already in action, and so bring in more expertise on what remains a crucial issue in future design and energy issues. As well as generously donating their remaining resources, SSEG's will give SEDA members access to their archive of their long running magazine SunTimes (now onto its 37th edition!) for free downloads, which we will look to add as a section on our website.

The exact working details, and which activities SEDA Solar will run, has yet to be agreed, but we are discussing:

- Continuation of the Kerr MacGregor Award for Solar Innovation annually for new advances in research, innovation in solar equipment and solar designs in architecture and engineering.
- Seminars and study tours (both in Scotland and potentially abroad) to be publicised through SEDA
- Attending the All Energy show for the first time as SEDA Solar, to better co-ordinate with other sustainable energy groups round the rest of the country and attract more members

We hope this is something SEDA Members will welcome and many of you may want to get involved in or be able to use to bring yourself up to date on where solar design is. If you want to know more or be involved in SEDA Solar, please for now get in touch with David at: [info@seda.uk.net](mailto:info@seda.uk.net)

**ALL-ENERGY**  
EXHIBITION AND CONFERENCE 2020  
13-14 MAY, SEC GLASGOW

**SEDA Solar will have a stand shared with AES Solar. Topics coming under the conference spotlight in 2020:**

<ul style="list-style-type: none"> <li>- Bioenergy Biomass, Biogas, Biofuel</li> <li>- Carbon capture &amp; storage (CCS), and carbon capture usage &amp; storage (CCUS)</li> <li>- Circular economy in the built environment - policy/ strategy, projects, case histories, challenges &amp; opportunities, innovative solutions</li> <li>- Community and local energy</li> </ul>	<ul style="list-style-type: none"> <li>- Corporate PPAs Energy efficiency in the built environment – policy/ strategy; the business of energy efficiency; case histories; corporates</li> <li>- Energy from waste - policy/strategy; challenges and opportunities</li> <li>- Energy storage</li> <li>- Energy systems – steps to be taken to achieve net-zero. Policy/strategy</li> </ul>
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The Sequel  
film screening and shorts by

As part of Fashion Revolution Week, a film showing of "The Sequel" and short films made by ReMode participants. "The Sequel" daringly re-imagines a thriving, resilient civilization after the collapse of our current economies, drawing on the inspirational work of David Fleming, grandfather of the global Transition Towns movement.

19:00 – 22:00 on Tue, 21 April 2020  
Glasgow School of Art, 167 Renfrew Street  
Glasgow G3 6RQ

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Architecture Students Summer School  
Climate Crisis Action  
followed by  
SEDA Conference  
Early June- date tbc  
Glasgow



# Sustainable Thoughts

First, Do No Harm

*John Easton*

I recall when I was first admitted to architecture school back in 1978, being struck at the time by the similarities between medicine and architecture; 7 years to qualify, a shared desire to make the world a better place, and to create some beauty along the way.

I was particularly struck by the moment during my own university graduation when the new doctors among us were asked to rise and to swear the Hippocratic Oath. As an architect I felt a strong sense that I should stand with them and swear something similar.

But that is not how architecture has worked in our time. We operate on the natural world on the instructions of our clients, seldom having fully discussed the implications, or options other than the knife. The main difference it has been said, is that physicians bury their mistakes, while architects build enduring monuments to theirs.

We take our client's brief and may ask questions to clarify their intentions. But seldom would we question the need for or the wisdom to build in the first place. Perhaps we should. Perhaps we should swear to do so.

But the do-nothing option is never taken seriously, since it is required simply to justify a decision that had already been made; to do something.

If an architect's skill is about meeting a need, and creating something beautiful in the process, then first we must identify the true nature of the need, its justification, and what the options are to meet it.

It needs enquiry of a sort that we are unused to; a deep willingness to question the brief.

That new skill could reveal some surprising things, and our clients could discover how not to build in new and unexpected ways. And if a new building turns out to be needed, it must now be the option of last resort and must always be done in a way that both protects, restores, and enhances the natural world otherwise it must not be done at all.

The Declaration of Geneva as it is sworn today was developed from the writings of Hippocrates circa AD 275. I think that I prefer much of Hippocrates' original, however.

We could go a long way simply by replacing the word "human" or "patient" where it appears in the Hippocratic' Oath with "natural world".

It turns out, however, that architects already have a declaration of sorts, and have done so for many years, unnoticed by most and sworn to by none.

The 1993 Chicago Declaration (since updated) by the International Union of Architects (UIA) which followed the first Earth Summit, in Rio in 1992:

...We commit ourselves, as members of the world's architectural and building-design professions, individually and through our professional organizations, to:

Place environmental and social sustainability at the core of our practices and professional responsibilities

Develop and continually improve practices, procedures,

products, curricula, services, and standards that will enable the implementation of sustainable design

Educate our fellow professionals, the building industry, clients, students, and the general public about the critical importance and substantial opportunities of sustainable design

Establish policies, regulations, and practices in government and business that ensure sustainable design becomes normal practice

Bring all existing and future elements of the built environment – in their design, production, use, and eventual reuse – up to sustainable design standards.

As architect's then, what oath should we now swear to the natural world to whom we owe our first duty, made so gravely ill under our profession's knife?

First do no harm. ■

Extinction Rebellion

SEDA supports XR.



There are local groups across Scotland. Visit [XR Scotland's Website](#) to find one nearest you