

Spring 2023

SEDA

Scottish Ecological Design Association

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RETROFIT



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Spring 2023

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 comprises a large number of people involved, 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 involves 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 have the opportunity to connect with a wide network of talented designers.

Editorial team

Nick Domminney, Viktoria Szilvas, Doug Tullie, Sean Hendley

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!

Cover image: Retrofit - ACAN; Dorothea El-Humidi

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Scottish Ecological Design Association

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ISSN 2754-9194

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Retrofit

ACAN Scotland

Architects Climate Action Network (ACAN) was formed by three architects in 2019 during a protest and takeover of Waterloo Bridge by Extinction Rebellion. Seeing the thousands of people around them passionate for climate action, they wanted a group that gave a voice and platform for those like themselves in the built environment, who wanted to be part of change but didn't have the agency or decision-making power in their practice.

Capturing that energy and combining it with a mindset of openness and mutual support, ACAN has grown into a network of thousands, with volunteers delivering campaigns on Regulation of Embodied Carbon, Conservation Area retrofit guides, calling out greenwashing from architects and institutions, with a busy programme of events, exhibitions and ACAN groups across the UK and Europe.

Our growth is no doubt also because we're at a conjunction of unprecedented

and outrageous crises, with fuel poverty and cost of living rocketing (both euphemisms for despicable profiteering by energy companies sanctioned by a corrupt government), a crisis of profession and education where, the financial and mental demands of architecture, to name only two, are being questioned by a younger generation, and of course the ever-worsening climate emergency destroying Earth.

Retrofit has been an essential and immediate rallying cause to get behind - and why it was chosen as the theme for this SEDA magazine issue - as it covers technical solutions as well as wider conversations around cultural transformation and decarbonisation - two of ACAN's three aims. It challenges the pervading 20th-century approaches of sole genius architects delivering ego-led projects to one where maintenance and community are prioritised over business-as-usual cycles of demolition and rebuild.

It's an important driver for change in the industry as we approach vital climate targets.

ACAN Scotland is small but growing, and thankfully intersects with the many talented and passionate people creating change around retrofit in the country, at varying scales of engagement, methods and points in their careers. So we have contributions from individuals, community groups, practices and organisations, covering topics such as policy, problems of scale, working with local authorities, alternative career routes, and campaigns we've supported like Wyndford Residents Group and collaborators like Civic Square and BE-ST.

We're a network led by people power calling for radical change in the built environment and hope that the articles here around Retrofit speak to how varied climate action can be. ■



ACAN, SEDA and Retrofit

Nick Domminney

SEDA magazine invited ACAN Scotland to guest edit this Spring edition, not only because SEDA seeks to link with organisations which are challenging climate and ecological crises, but because ACAN is deeply engaged with all aspects of what has fashionably become known as Retrofit. Last year SEDA set up a number of groups to develop thoughts on key concerns such as health, education (see below) and materials. One of these is Retrofit, hence the invitation. ACAN have assembled a range of contributions from activists and experts engaged in a wide range of campaigns and consultancy.

This edition also has a series of articles from the SEDA Education Group, which gives us a snapshot of the Group's considerations. On education, SEDA's Kirsty Cassels reprises her presentation to the December 2022 Show & Tell about her retraining from architect to carpenter. While Dan Gates of Luths Services follows up with examples of how heat pumps can contribute to retrofit.

We have a SEDA Land report by Ramblers Association's Helen Todd about the recent rural tourism webinar. SEDA Solar centres around last May's Scottish Parliament debate on solar power. SEDA Specification has the background and potential of glued laminated timber (glulam) by Peter Wilson of the Mass Timber Academy, one of many we have run about the construction. SEDA Chairperson, Catherine Cosgrove, gives us her Thoughts on the back page. And we have introduced a new feature,

Greenwashery, which aims to take a wry look at some of the more egregious examples of greenwash. Please send us your worst specimens.

Finally, SEDA magazine is looking for a new editor. I will step down after this edition, so we need a volunteer to join the magazine team to develop this vital part of the association's communication strategy. No particular skills are needed - the team and I will lead you through the production process - but you should have an interest in SEDA's aims and the desire to create a publication, which engages and excites SEDA members and readers. If you would like to know more, contact Nick at magazine@seda.uk.net ■

**Scottish Ecological Design
Association (SEDA)**

**Magazine Editor
Required**

SEDA magazine is an online quarterly to all members and subscribers. The magazine team are looking for a volunteer to join us as editor in developing this exciting and enlightening ecological periodical.

If you would like to know more, contact Nick at magazine@seda.uk.net

Young Architects & Activism

Bobby Jewel

ACAN was formed out of frustration by young professionals lacking agency in their day-to-day jobs and seeking change through collective action in a climate emergency. We're still a network guided by that sense of empowering individuals so for this takeover I spoke with two younger members of ACAN Scotland about being let down by traditional practice and education, seeking out different challenges in their career and climate activism. Though retrofit offers some opportunities, there are greater issues at play preventing a truly transformed built environment.

Carmen Lean:
former GSA student and activist
with Wyndford Residents Union

I find it difficult admitting I was let down by my architectural education. My default position is, "I just wasn't cut out for it" - permission not to think about it too much. The deterioration of my mental health while I was studying, then improving whenever I had time away, doesn't leave me with too many regrets about leaving early.

For the last year I've been supporting the Wyndford Resident's Union in their campaign to stop the demolition of 600 social homes. Since 2006, Scotland's biggest social landlord Wheatley have demolished 17,000 socially rented homes in Glasgow, and built only 4000, many of which are for sale or mid-market rent. This regeneration, which has so far lost Glasgow 13,000 homes, has exacerbated



the housing shortage and seen rents climb across the city, hitting young people especially hard. Currently the Wyndford Resident's Union are organising and pushing back against the latest demolition plans, four tower blocks in The Wyndford Estate arguing they should instead be retrofitted and refurbished like those at nearby Cedar Court.

I talked with so many different people about these flats, it's left me reflecting on what a missed opportunity every university project is, that isn't directly linked to a community in some way.

As a former student at the Mackintosh School of Architecture, I enjoyed the studio's panoramas of Glasgow's skyline and looking down into the streets, but it was strange how little opportunity we had to interact with the city and the other people who occupy it given workloads consigning us to our desks.

Perhaps being oblivious and able to turn a blind eye to that complexity makes us more employable, but it doesn't help us operate as good actors in a local or global context, or empower us as people. If we're not out and on the ground, speaking to different people, we never get any kind of messy reality check.

Without urgent and significant political change, so many young architects will stay stuck in the same destructive cycle: a hamster wheel of demolish and replace – making a living but playing their part in destroying life support systems. It feels quite sadistic that for my generation, as rents and food prices go up, we are more dependent than ever on a system that chips away at any hope for a liveable future. If offered a job by an exciting practice such as Collective Architecture (working with Wheatley on the gentrification of Sighthill) or New Practice (working on the demolition and replacement of Buchanan

Galleries), I imagine most students would be grateful for the opportunity.

I don't have the answers to how we break out of this cycle, or empower ourselves to do work that contributes to social, economic and climate justice.

Lily Bell: Part II Architect and Freelance Designer/Maker

Despite an increased awareness of the climate emergency across society and in architectural practice, budgets remain so tight that there is rarely the scope to support extra research and/or additional material costs to improve the environmental quality.

Professionals are often tied into hitting certain targets which allow for projects to be signed off with specific 'eco-accreditations', however this denies the opportunity for the project to be addressed more holistically and organically. For example, a project where the building envelope is plugged with plastics/microplastics within 'super-insulative' materials can be ticked off as highly energy efficient, whilst no attention is paid to their toxicity and the resultant impact on the environment.

With regard to education, I can't help but feel as though environmental techniques were always taught as an extension to the more conventional aesthetic design, rather than highlighting climate strategies as a fundamental component of the design from the off.

When I set out on the architecture career path almost 10 years ago, I was prepared for (or not so prepared for) a 7-year slog, consisting of; Part I, Part II, Part III, qualified 'Architect', complete! There didn't appear to be an alternative route.

During my year in practice post-Part I, I was fortunate enough to work alongside/be taught by/be inspired by a series of individuals who had broken away from the traditional chain of university commitment, and instead pursued alternative careers within the industry, despite not attaining the definitive status of an 'Architect'.

I enrolled onto a 'Women in Construction' course, whilst working on freelance architectural projects, as I have always passionately felt that the divide between architects and construction workers is detrimental, and hope to be able to bridge that gap in some way, in order to contribute to a more cohesive and efficient design team.

With regard to retrofit, I think the major appeal for me personally is that the existing structure can be such a powerful catalyst for creating unique and innovative design solutions, it should be worked with and not against, or worse still, ignored completely.

I find the construction of new-builds (specifically mass produced housing schemes) to be like a photographer capturing the focus of an image perfectly whilst paying no attention to what lies beyond, creating a composition where the

foreground appears totally disjointed from the background. Context is everything in architecture; it should be the catalyst for unique and stimulating design, it should bring challenges which force innovative solutions.

Once again, economic factors have driven the preference for demolishing and starting from scratch, as opposed to retrofitting existing structures, due to outdated tax systems which incentivise new-build construction. Hopefully, as the devastating impacts of climate change become harder to ignore (for those in positions of power), revised regulations will instead promote more environmentally sensitive methods for improving and expanding our built environment. ■



Images:
Below: Lily Bell, Women in Construction Course.
Overleaf: Carmen Lean (left) at Wyndford Residents Union demo outside Glasgow City Council © Claire Peden.

Retrofitting Towards Scotland's Just Transition: From Detail-to-Detail to Street-by-Street

Scott McAulay, ACAN Scotland

Drawing on time contributing to, and learning from, Retrofit Reimagined and the launch of [Civic Square's Neighbourhood Doughnut Portrait in Birmingham](#), ACAN Scotland's Scott McAulay draws out lessons that we can localise for neighbourhood-scale work in Scotland that support a Just Transition, beyond a recent focus on energy.

Scotland's greatest untapped resource in our struggle to end today's cost of survival crisis is not the oil beneath the North Sea, but the transformational capacity of homes, streets, and neighbourhoods as part of a decentralised, localised, and radical Just Transition.

The Climate Justice Alliance defines a Just Transition as “a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to shift from an extractive economy to a regenerative economy” - so, stepping beyond a fossil fuelled economy, without leaving people behind is the goal, and retrofitting offers routes towards that. But realising this untapped potential requires that we deepen our definition of what it means ‘to retrofit’ – scaling it up, beyond an industry buzzword, or an action to reduce one household’s energy bills, and reimagine it as collective, interconnected actions that extend beyond fabric first approaches and property lines; recognising that what holds us back isn’t a lack of expertise or technology: it’s systemic.

What holds back the scale of retrofit that we need to see is a combination of knotted problems. Involving: power imbalances – between tenants’ rights and landlords’ whims; a lack of long-term government funding (restricted by an economic system reliant on endless growth, and sustained sacrifice zones); fledgling physical and social retrofit infrastructures; and insufficient workforce numbers to do the work needed to reach climate targets (PHT, 2021), to name a few factors of many. Beyond this, decades of insufficient maintenance of Scottish buildings (SHCS, 2019), and lacklustre new build standards, have set the scene for household energy demand being avoidably high today, when Passivhaus has been possible for over 30 years. Recent energy company profiteering is now, why the cost

of meeting basic heating needs is forcing tens of thousands more households into fuel poverty, contributing to 13,400 deaths due to cold homes in the U.K. last winter (ONS, 2023). As the climate crisis dysregulates seasons and weather systems – intensifying extremes and Scottish norms, we must look beyond individual retrofit projects, and identify how to affect broader, systemic, regulatory changes, and catalyse scalable action locally, and at pace.

This life-changing endeavour should be envisioned as one comparable to the founding of the National Health Service – with its vast unionised workforce, extensive supply chains, physical infrastructures, social infrastructures - that reach out into local communities, its ability to bolster public health, and ultimately, to save lives.

Whilst we have much of the design and technology aspect cracked, Scotland’s architects and construction industry also have much to learn about reimagining retrofitting beyond individual buildings, and how to tell that story in ways that people can get behind, beyond carbon statistics, details and graphs. At Retrofit Reimagined last year, Civic Square stewarded four revolutionary days of inspiration and sharing knowledge around such themes, where they posed many “What if” questions, and most memorably, one that Scotland should ask itself:

‘What if the climate transition and retrofit of our homes and streets were designed, owned and governed by the people who live there?’

Images:
Below, left: Retrofit Reimagined; Angela Grabowska
Below, right: The Anthropocene Architecture School
at Retrofit Reimagined: Angela Grabowska



Generously hosted by Civic Square – a “public square, neighbourhood lab, a creative and participatory platform focused on regenerative civic and social infrastructure”, and co-planned with ACAN, Dark Matter Labs, and Zero Carbon House, Retrofit Reimagined was part of a 3-week long Regenerative Neighbourhood Festival, and its programming and atmosphere embodied this. Situated in a field by the Edgbaston Reservoir - rather than in yet another conference centre, and within John Christopher’s Zero Carbon House, the welcoming festival bore many similarities to the civil society spaces realised around Glasgow during COP26. Gathering activists, architects, artists, community organisations, faith groups, neuroscience

laboratories, retrofit cooperatives, storytellers, and Civic Square’s neighbours, to get inspired, eat together, and to learn from those whose work puts the festival’s themes into practice.

During Retrofit Reimagined, Civic Square also shared their own visionary neighbourhood retrofit work, and of synthesising Kate Raworth’s Doughnut Economics into their wider portfolio of projects. Of key relevance to this piece, there were updates on how Civic Square are working with neighbours on Link Road, to lay the groundwork and build the social infrastructure not only to retrofit 37 homes but the entire street, of every conceivable tenure, in ways that bring value into the commons. This has involved

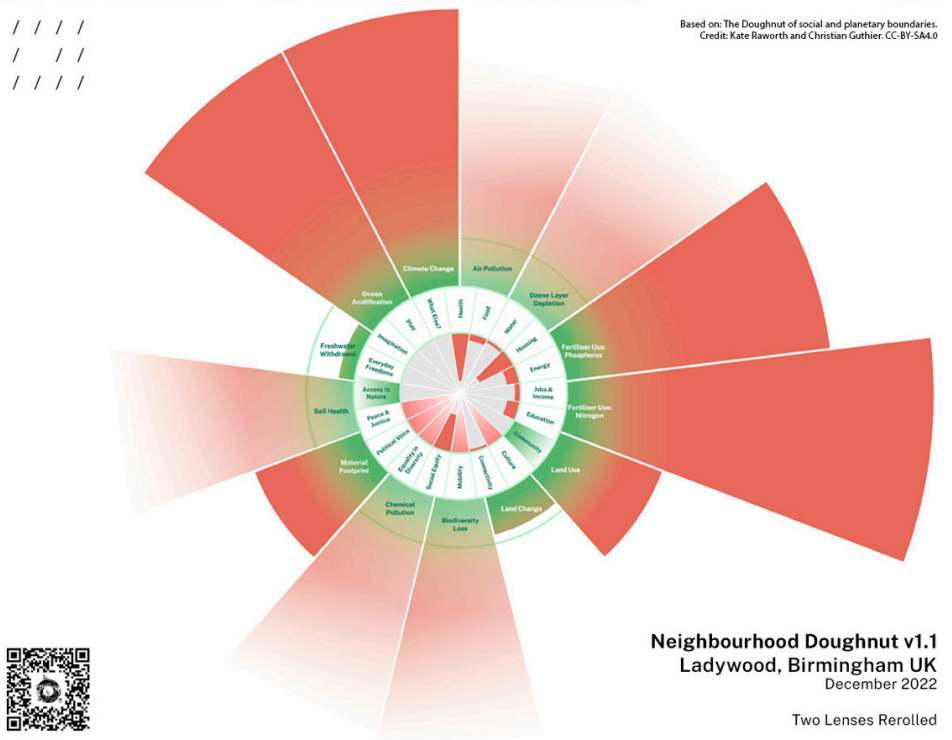
exploring new funding models, building trust, decentralising control, identifying what limits community participation – such as a lack of time due to caring or childcare responsibilities and collectively realising solutions, organising retrofit assessments, and consistently turning up with a stall and hot drinks - wind, rain, or shine.

Civic Square’s work is built upon an ethos of creating as many entry points as possible for their local community, of weaving storytelling throughout, building replicability into their work, of celebrating milestones together, and of working at the neighbourhood scale. Realising the first Neighbourhood Doughnut Portrait – situating Ladywood in relation to the

Image:
Neighbourhood Doughnut - Ladywood, Birmingham; Civic Square

rest of the world building upon Kate Raworth's model of Doughnut Economics, embodies this powerfully. Localising and building upon the Leeds City Doughnut methodology, they assessed where they are today, and created a compass for developing future projects, that could also be used to inform future policy in the neighbourhood. The launch of this work happened both physically and digitally as celebratory events, with its methodology and resources being made open source through the Doughnut Economics Action Lab.

Scotland and SEDA's members could learn a great deal from Civic Square's work in Ladywood: its focus on the neighbourhood scale; its variety of entry points - from after-school clubs and retrofit stalls to Doughnut Economics book clubs; and the consistency of its local presence. This is no downplaying of Scotland's achievements but an envisioning of what more we could do should we reimagine how we go about doing it. What if we were...to break free from the resource-intensive cycle of awards, conferences, and inward-looking events - reimaging them as opportunities to imagine another future together; to support communities that could use our skills and knowledge of sustainable construction and retrofit - especially, in areas like Glasgow's Wyndford Estate and Aberdeen's Torry; to communicate, and share space, with climate activists, civil society, and labour movements in meaningful ways, and to reconcile with the reality that nobody's coming to save us?



Incrementally tweaking what we've always done won't transform Scotland's construction industry, or its housing stock. We must start thinking systemically and acting locally: communicating creatively and imaginatively about Just Transition opportunities in buildings; identifying how our work can support the realisation of neighbourhood-scale retrofit infrastructure; and embracing that much of the work that we do must fundamentally change, from creation to stewardship.

As friend, former oil worker, and climate activist, Neil Rothney, puts it so powerfully: the climate crisis is here, and a transition is coming – it's unavoidable; we've also seen what unjust transitions, that put profit before people, have looked like in living memory. Such injustice mustn't happen again. What we can do, is collectively champion the role of neighbourhood scale retrofit, and build power to shape this coming transition, to be a Just Transition - with the thriving of our communities, and those beyond Scotland's shores, at its heart. ■

Community-led intermediation for domestic low carbon retrofit

Chris Carus, Loco Homes

Retrofit is difficult for homeowners but a co-operative approach can unlock progress. Loco Home Retrofit CIC is a community-led co-operative social enterprise in Glasgow taking on new members, staff and partners.

Home heating accounts for around 20% of territorial emissions in Scotland and the global price of gas is a key driver of the cost of living crisis. Yet, amidst busy lives, most households are overwhelmed by the complexity, disruption and cost of retrofitting their homes for energy efficiency and fossil fuel free heating. To make things worse, there is a critical shortage of contractors they feel they can trust. Many households end up settling for whatever comfort can be achieved with their fuel budget or install single measures that are often of poor quality.

Loco Home Retrofit CIC aims to make better retrofit more accessible for more people in Glasgow. Launched in 2021, it is constituted as a non-profit co-operative of households and built environment professionals. It is governed by its membership, now standing at 130 members, and served by a small staff. Co-founder Tom Nockolds says much can be learnt from community energy projects. *“Community owned wind turbines put local people in control of the energy transition, transforming the economy while engendering trust and consent for change. We want to do the same with domestic demand reduction and renewable heat”.*

Aside from decarbonisation of the grid, there has been very little reduction in Scottish domestic carbon emissions for almost a decade. Frustrated with political, market and regulatory failure, Loco Home members seek to make progress by acting collectively. *“We want to build something better than atomised, market-led response on which policy makers currently rely”*, says co-founder Chris Carus. *“Households in a street of similar houses shouldn't have to navigate the complexity individually. That's why we're working with partners and with funding from Innovate UK and CivTech to develop a customer journey for neighbourhood scale projects based around building archetypes”.*

Almost all of Scotland's 2.7 million homes, plus more to be built in the next few years, will need to be retrofitted to a zero carbon standard. The technology and methods for zero carbon homes already exist, but innovation is needed to develop the still-immature market for effective, whole building approaches. *“With this abundance of work to be done, we find leading practitioners are willing to take a collegiate approach to solving the challenges”*, says Chris. *“As an intermediary, we intend to grow and aggregate demand, in turn supporting the growth of a supply chain base of designers and installers”.*

Loco Home Retrofit provides online and in-person resources for information, education and peer support. It also provides a service that develops bespoke step-wise retrofit plans that integrate with maintenance and renovation goals. Furthermore, it is developing approaches

for collective action by owners with funding from Innovate UK and CivTech.

Central to Loco Home's theory of change is the importance of trust. With deeply disruptive messy interventions in homes, households want to be confident that their budgets are being directed effectively towards appropriate, high quality, low regrets impacts rather than profit. *“Loco Home's elected board are the representatives of the moral owners of the company - households across Glasgow - and we are currently strengthening our governance policies to put households and social impact first”*, says board member Carey Doyle. *“We're baking into our governance the principles of quality and environmental justice”.*

Loco Home Retrofit was originally inspired by the success in [Manchester of Carbon Coop](#) and its deep retrofit one stop shop spin off, People Powered Retrofit. Chris says, *“We're fortunate to have the example of Carbon Co-op to follow. They provide valuable mentoring to help us 'socially franchise' their intermediation concept. We hope to pay it forward elsewhere in Scotland, too”.*

The case studies from Glasgow, overleaf, show how collective action is inspiring and empowering households to take control of their lives and homes.

Empowering Renovators/ Raising the Value Perception of Home Improvement

Homeowners Eachann and Vic had ambitions for aesthetic and amenity improvements for their solid wall mid-terrace house in Glasgow. To maximise the impact of their plans, they commissioned a retrofit assessment by Loco Home's Chris Carus, who is a Certified Passivhaus Consultant, AECB Carbonlite Retrofit graduate and is Heat Geek trained.

“Chris provided us with a step-wise pathway to replacing the boiler with a heat pump which we are integrating with our improvement plan”, says Eachann. *“The plan includes converting the heating to a*

low temperature system. We have installed some triple panel radiators and turned down the boiler flow temperature giving us some instant efficiency gains.”

“The education we got from Loco Home also influenced our choice of architect.”, adds Vic. *“We have a Passivhaus qualified architect where we might have chosen someone known only for their aesthetic impact.”*

Enabling peer support

Within Loco Home's membership of 130 householders, there are some keen self-renovators. Influenced by case studies, meet ups, expert webinars and Loco Home's online members forum, they are collaborating on their home retrofit

projects. Some remarkable innovations are emerging.

Richard Taylor, a civil servant, took on board the principles of subfloor ventilation and minimising thermal bridges. He developed his own creative design for a fabricated aluminium periscope to maintain airflow from the vent at joist level through his 600mm thick tenement basement wall. This enables continuous insulation and airtightness layers.

“Loco Home revealed opportunities for improving comfort that I didn't know were possible. Through the Loco Home co-operative and its online discussion platform householders like me are gaining peer support and information that helps us get unstuck on reducing our environmental impact”.



Images:
Above, left: Eachann and Vic
Above, right: DIY innovative periscope; Loco Home

Image:
Below, left: Gemma Crook on BBC; Gemma Crook
Below, right: Parge Coat; Loco Home



Building the Local Sustainable Supply Chain

Government programmes seek to build the supply chain primarily with larger companies and college training. We believe place-based intermediaries have the agility ability to support local small businesses to expand their offering to include energy efficiency. A case in point is Gemma Crook, aka Plaster Lass. Gemma is a plasterer who chooses to use low embodied carbon materials including lime and clay. She contacted Loco Home after seeing our webinar about retrofitting traditional buildings.

“Loco Home introduced me to methods and customers for low carbon retrofit. Now I’m pursuing further retrofit training”.

Loco Home has spent a large part of the last year applying for core funding to amplify and accelerate its impact. That search has been largely fruitless because Loco Home doesn’t fit well with existing third sector funding models and increased financial tightness in the third sector which is limiting innovation. *“There are many funds and organisations doing excellent work on fuel poverty or connecting with nature but we want to help fill the huge gap for community-led action on emissions from residential buildings. Cooperative approaches to Net Zero at the home scale seem to be a funding gap, so we’re going to change tack”*, says Carey.

“While we have to focus on establishing the social enterprise, we are finding we can

expand our impact with the help of volunteer members”, says Chris. *The online forum and in-person events are growing sources of inspiration and information for households. We are building a group of informed, passionate, resourceful homeowners delivering retrofit in their homes. As part of our cooperative approach we’d love to see more expert practitioners, homeowners, and tenants in these discussions, driving quality, building trust, building the industry and making low carbon homes a reality for everyone.”* ■

Contact Loco Home info@locohome.coop

Find out more at <https://locohome.coop/>

Loco Home is recruiting <https://locohome.coop/2023/01/were-hiring/>

A Call for Evidence: can we lead by examples?

Alex Reeves: architect, Architype <https://www.architype.co.uk>

We have reached a point of intersecting crises in existing buildings. There is the very real need to mitigate the climate impact of carbon emissions from energy used in the built environment, with recent analysis by WWF Scotland finding Scotland is on course to miss its targets for decarbonising heat in buildings.¹ There is also the emerging crisis in environmental health – both mental and physical – which is the result of poorly built, maintained or otherwise unsuitable buildings. The Scottish Government's recent decision to dramatically improve the performance of new-build housing is laudable but makes the lack of comparable progress on retrofit policy even more apparent. Organisations such as the Scottish Futures Trust are rapidly progressing their retrofit agendas and initiatives, but there is still a great deal to be done before retrofit is a mainstream concern.

The energy and cost of living crisis has dramatically demonstrated the human consequences of the poor environmental quality in Scotland's existing building stock. The Daily Record recently reported on a housing association tenant whose energy bills had increased six-fold due to the combined effect of increasing global energy prices, and the installation of an inappropriate air-source heat pump.² At face value, this appears to be a well-intended attempt at decarbonisation, installed without awareness of the level of improved fabric performance required to reduce heating demand to an economical level. The tenant describes both the mental health impact of increased bills,

and the physical health impacts of not being able to heat his home. This is a story being repeated across the country. And beyond housing, poor building condition – and well-intended but poorly planned improvement measures – has become an issue in a broad spectrum of buildings, from schools to hospitals to prisons.

So do politicians, government bodies, local authorities and those responsible for large estates of buildings really understand the complex challenge of retrofit, as well as the need? Is the scale of this challenge holding back policy makers and strategic decision makers from implementing meaningful change?

The answer to this is increasingly yes on all counts – the majority of those with responsibility to make decisions in relation to existing buildings do understand the urgency of the issues we face. But for many, retrofit is still a novel concept – which doesn't fit easily into the existing organisational silos of capital investment planning, routine maintenance budgets, preventative public health initiatives or conservation policy. When the complexity of even the smallest deep energy retrofit becomes quickly apparent to all involved, it's not surprising that examples of retrofit strategy being delivered at scale remain thin on the ground.

But important change is occurring. Domestic retrofit at scale is gathering pace with East Renfrewshire aiming to retrofit 3500 homes to EnerPHit standard.³ There is a huge push from organisations

intending to understand their estates but with very little knowledge of how to do it, meaning an increasing portion of Architype's workload is studying, modelling, and developing proposals for existing building estates.

Many of these new clients are local authorities driven by political commitments to decarbonise by a target date (2050,2045,2030) but also looking for a more holistic understanding of the wider benefits their investments in existing buildings can bring. Our challenge as architects goes well beyond reporting potential energy savings and lifecycle costs. What does retrofit look and feel like? How do we deliver it quickly without impacting quality? How do we communicate our ambitions to stakeholders and communities who will be impacted? How do we know we are getting it right?

Positively, there are now many useful resources on retrofit from organisations like [SEDA](#), [LETI](#), [Historic Environment Scotland](#), [The Passivhaus Trust](#) and [AECB](#). PAS 2035 and PAS 2038 provide a detailed and robust process for clients and professionals to follow when approaching retrofit projects. Voluntary design standards such as EnerPHit provide tested, benchmarked metrics for projects to target. An ever-increasing number of building professionals are trained in these and other standards. The construction industry is slowly beginning to upskill.

Images:
Below: Entopia before/after © Architype / Soren Kristensen (SOLK photography ltd)



There are some widely published and standout case studies delivered by Scottish practices. The Woodside flats in Glasgow – an EnerPHit retrofit for Queens Cross Housing Association by Collective Architecture – was widely publicised during COP26 with accounts from residents on their near-zero heating bills and improved quality of life.⁴ John Gilbert Architect's Niddrie Road EnerPHit for Southside Housing Association demonstrates a scalable approach to the very common shared tenement typology.⁵ Architype's own Entopia project, recently featured as a case study for ACAN Existing Building's webinar series and serialised in the RIBA Journal, has introduced a wide audience to the challenges and successes of delivering an ambitious and very technically challenging retrofit of a major university building to achieve EnerPHit, WELL Gold and BREEAM Outstanding.⁶

But given the scale of the challenge we collectively face, and the rate at which we should already be addressing it, there needs to be many more examples of retrofit in action.

This presents a unique challenge for practices at the leading edge of retrofit – promoting the benefits of a retrofit first approach with a limited pool of worked examples, whilst developing the pioneering projects which will become the examples for future development. Architype are working daily with clients ambitious to develop retrofit strategies, and the direction of these strategies could end up influencing decisions on hundreds of buildings. Our retrofit team have analysed

buildings across Scotland for councils including City of Edinburgh and East Ayrshire, spanning different use-types, construction typologies, ages, heights, and levels of architectural value.⁷ We have approached each study individually through a quantitative technical analysis which looks at the optimal pathway for retrofit using the Passivhaus EnerPHit design criteria. This ensures a rigorous first principles approach that avoids reliance on traditional preconceptions.

Architype are in a very fortunate position; we can underpin our analysis with visits to completed projects and share in-use performance information. We can demonstrate to planners how we've balanced heritage considerations against building performance successfully. We can give examples. And as our work in the field of retrofit grows so too does the library of examples we can draw on to guide this process. We start to see the trends, common issues and necessary considerations which make every new project easier than the last.

But even when utilising these resources to communicate and explain the retrofit process and its likely outcomes, it's clear that even the most inquisitive and forward-thinking clients are often surprised – and sometimes challenged – by the realities. Therefore, in order to change mindsets, manage expectations and promote the responsible management of our existing buildings for people and planet, we need to continue to lead by examples. For retrofit to work – and we all need it to work – we need to show our working out. ■



1 <https://www.wwf.org.uk/sites/default/files/2023-02/WWF-Affordable-Warmth-Scotland.pdf>

2 <https://www.dailyrecord.co.uk/news/scottish-news/scots-man-forced-choose-between-28736255>

3 <https://www.passivhaustrust.org.uk/news/detail/?nId=1096>

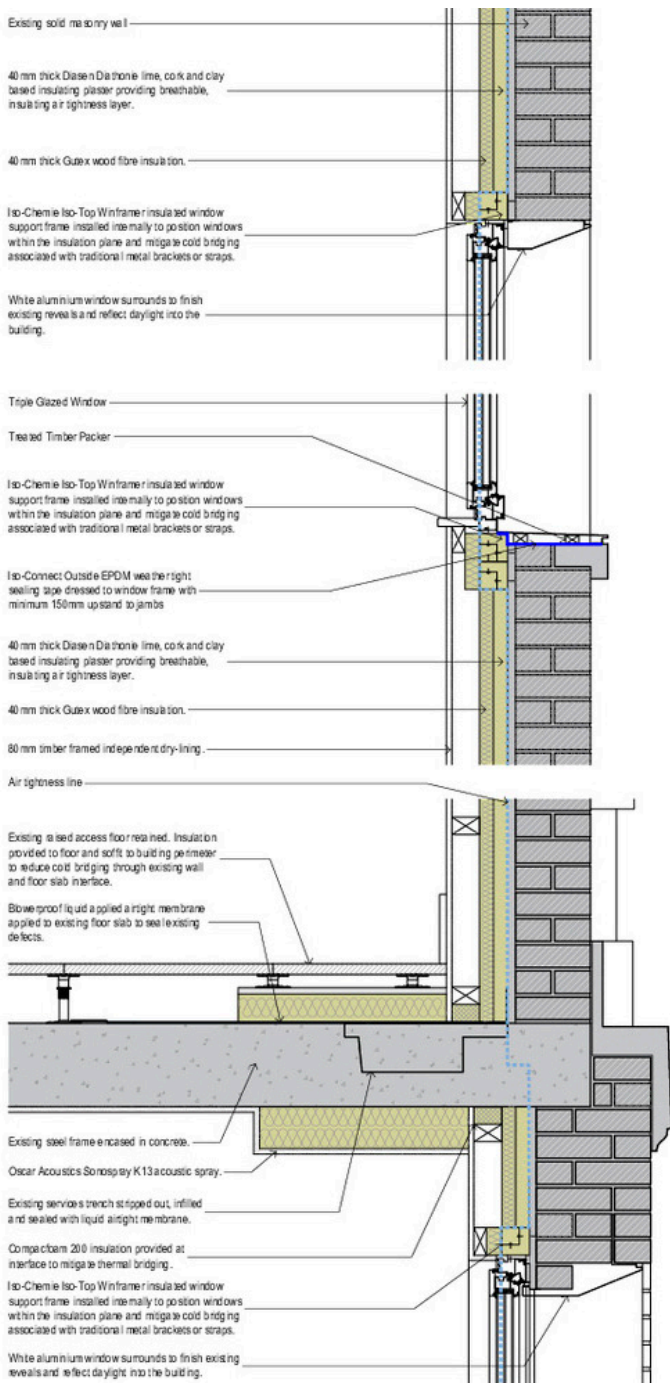
4 <https://www.glasgowlive.co.uk/news/glasgow-news/glasgow-man-hasnt-switched-heating-22165160>

5 <https://passivhaustrust.org.uk/news/detail/?nId=1020>

6 <https://www.ribaj.com/intelligence/sustainable-retrofit-cambridge-institute-for-sustainability-leadership-riba-plan-of-work>

7 <https://www.passivhaustrust.org.uk/news/detail/?nId=1122>

Images:
 Previous & below left: Entopia window replacement study © Architype / Soren Kristensen (SOLK photography ltd).
 Below, top: Entopia interior sketch © Architype
 Below, bottom: Entopiacompleted interior © Architype / Jack Hobhouse



Social justice, domestic retrofit and a cultural shift

Sara Edmonds: Lead Technical Consultant - Built Environment - Smarter Transformation (BE-ST)

We're lagging behind when it comes to domestic retrofit. The buildings we live in aren't only falling short from an energy efficiency perspective, the retrofit challenge is also intrinsically tied to social justice. To address this, we need to usher in a radical cultural shift - and quickly.

It is a truth universally acknowledged that if we continue down the path we're on, we are not going to reach our goal to reduce the carbon emissions generated by our homes to net zero carbon before 2050, or before 2045 in Scotland. Despite the work of community retrofit organisations and passionate practitioners, the current approach to retrofit isn't going anywhere near far enough – it's too slow, it's too expensive, and it's leaving too many people behind. Meanwhile, in the absence of national policy, nobody knows who is responsible for retrofitting our homes.

I became interested in retrofit because I was an architect who was worried about the impact the construction industry has on the climate, particularly through our homes. But it became clear that social justice is inexplicably entwined with our actions in the built environment. To acknowledge this and make the progress we need, the cultural conversation around retrofit needs to move on. It's not just about retrofitting so our buildings are high performing, but also about ensuring that our homes are warm, safe and affordable.

Delivering Retrofit

At the moment, the onus is often on homeowners. Funded schemes to date have focused on delivering retrofit on an individual basis and rely on the homeowner choosing to take action and largely paying for the interventions themselves.

Nevertheless, there are amazing organisations in the UK delivering retrofit projects. To name just a few, [People Powered Retrofit](#) is a not-for-profit in Greater Manchester offering independent retrofit advice to householders and [Cosy Homes Oxfordshire](#) is a one-stop home retrofit service.

Building relationships with their communities is key to these organisations. By working directly with individual households and the supply chain, they can see a clear picture of householder motivations and concerns so they can tailor their support and response. Not only does this approach build trust, it also works.

However, getting engagement – let alone buy-in - on this granular level isn't easy. Especially when [14% of the Scottish population live in privately rented accommodation and 24% in social housing](#) means a significant proportion of the population don't have the right to implement changes to make their homes warmer, more efficient, and less costly.

Currently, the Minimum Energy Efficiency Standard (MEES) Regulations set a level for domestic private rentals at an eye-wateringly low EPC level E. And, while this is the legal standard, and landlords – social and private - don't live in the homes they own, nor pay the bills, what is the incentive to make their properties go above and beyond this?

Although the UK Government has created funds for housing providers and local authorities to implement retrofit interventions such as the £3.8BN [Social Housing Decarbonisation Fund](#) which might sound promising on paper, so far, due to complicated application processes and stringent eligibility criteria, their impact has not been as widespread as hoped.

For most, retrofit feels complicated, confusing and expensive, and no one seems to know who to turn to for help. There is a challenge here that stretches far beyond retrofit and climate change, where people are being failed by the system and left behind, and this is creating a crisis of trust.

Coherent approach

But all is not lost if we switch the approach. We need to bring about radical change through a wholesale cultural shift that involves everyone – from property owners and householders, to policy makers and government, bottom up and top down.

Images:

Below left: BE-ST Workshop; BE-ST
Below right: Sara Edmonds speaking at BE-ST FEST 2022; Sara Edmonds

If we look across the water to our Irish neighbours, they're starting to bring retrofit into place at scale. By listening to experts and collaborating with industry, Ireland's government has implemented a 'one-stop shop' approach, much like People Powered Retrofit and Cosy Homes, albeit with robust multi-annual investment behind it, where the entire retrofit process is managed for the householder by one entity, and grants cover a huge percentage of the cost. What's more, this approach has created a pipeline of skilled work. All of this in turn, builds trust.

BE-ST

To make a joined-up approach to retrofit our reality, innovation centres like [Built Environment – Smarter Transformation](#) (BE-ST) are also key to instigating the cultural shift we are looking for.

For the past seven years, BE-ST has been striving to act as an organisation that can drive positive environmental change through inclusivity. One way we've achieved this was BE-ST Fest 2022, our annual conference, where we hosted grassroots retrofit groups like [Architects Climate Action Network](#) (ACAN) as well as politicians, architects and changemakers from across the UK.

We continue to foster this open approach by raising awareness of retrofit, building demand for and trust in it, enabling the development of innovative retrofit solutions, and delivering training and education to ensure the supply chain and the workforce will be able to implement retrofit at scale. This includes our [Low Carbon Learning programme](#) as well as Passivhaus and retrofit training.

But, we know we're not finished yet. We want to go further and continue to partner with other organisations to

exchange knowledge and support each other in addressing the retrofit challenge. So if this sounds like something you could benefit from, we urge you to reach out.

The moment that we start to wholesale shift the cultural value of homes as the places where we thrive, where we interact with each other, where we should at the very least be safe and warm, instead of prioritising deriving their value from monetary gains, is the moment that we might start to see a meaningful step in the right direction. ■



Heat pumps- outline options for dwellings

Dan Gates BEng IEng MCIBSE Luths Services. Glasgow dan@luths-services.com (m)07449 706 583

In dwellings there is a need to rapidly decarbonise our energy use to zero.

As the electricity grid will be decarbonised soon, the main challenge is getting off gas/oil for heating.

Scotland has around 2.6 million homes. If we want to meet our target by 2045, it is estimated that around 490 homes every day will need to be converted with new low carbon heating installed and we are currently at around 26 a day

It is true that there is an upfront cost difference choosing renewable heating over fossil fuel, however, extensive studies continually show heat pumps being the cheapest pathway to heat decarbonisation, mainly because the alternative options are more expensive. Typically there is a very small bill saving switching to a heat pump, compared to gas at the current time and prices, so many of these scenarios still require some capital support. This calculation may change soon as there is a talk of taxing fossil fuel rather than clean electricity.

I present a few alternative options to consider here.

Small stand alone

Heat pumps are devices that can move heat from one location to another using a refrigerant. In an air source heat pump the output is dependent on the incoming air flow rate and temperature. Generally,

houses need around 5-15kW of heating (average in UK is ~8kW). However, in a very low energy demand house (say <3kW- e.g. a small apartment) it is possible to get enough heating from the small amount of air flow you get from the air extract from bathroom or kitchen areas. A very small heat pump in the ducts from these extracts can provide heating and hot water for the apartment. As the heat capacity of air is limited you can only get say max 2-3kW out without an immersion top up, or having very high air flows (which is noisy). (fig1)

If the heat load is say >3kW, there is a need for increased air flow to get the higher rate of heat transfer. This is met by having larger fan units, which are placed externally, so they can transfer higher volumes of air to get the higher output. However, some suppliers are developing new solutions to “hide” the external fan unit including a flat panel with air intakes

Flats/ Tenements

The main comment I get is: “I can’t do a heat pump I’m in a tenement/flat”. Granted, it is more complex than as single owner property, but it is possible.

It is possible with good design to have external fan units on the ground floor or loft spaces (with good vent design) connected to flats in the block. No one really want to see multiple individual units on the outside walls as is common with air conditioning units abroad.

A novel approach is to introduce “shared ambient loops”- this approach uses a common ‘collector’ pipe which comes from central boreholes to collect free energy from the ground which is at say 10°C. Then each apartment uses their own mini heat pump to lift this heat to say 45°C. The advantage is each apartment has the heat pump on their own supply meter, so they only get billed for whatever heat they use. There’s is no communal billing or running parts or pumps to maintain for the residents.

The downside is that it requires blocks of residents to get organised and project manage an install. It doesn’t easily fit with current government’s grants, despite 950,000 to be tackled in Scotland. The good news is that communities are seeing it themselves and organisations like Locohome Retrofit (<https://locohome.coop/>) are providing common approach to these blocks of flats.

District and communal heating

In the past district/communal heating did have a bad name. District heating is connecting multiple buildings and communal heating is connecting individual houses in one building. Often without good design, long pipe runs and poor controls on the system led to high uncontrolled heat loss and inefficiency- which was passed on to residents in higher bills. The industry is much more aware of this now and some good schemes have been achieved.

Images:

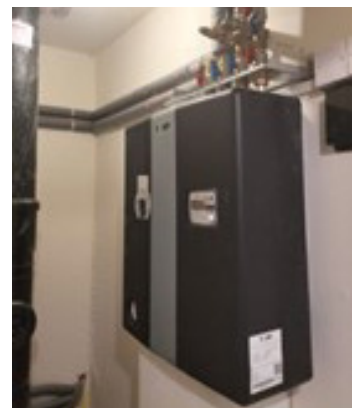
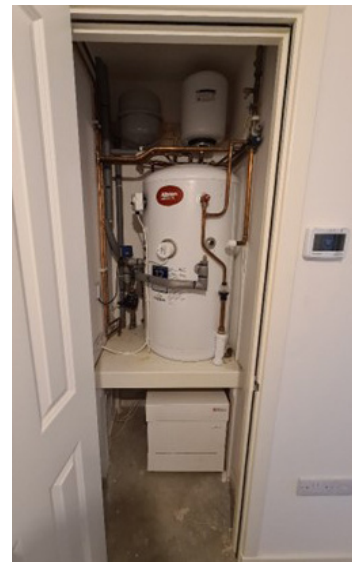
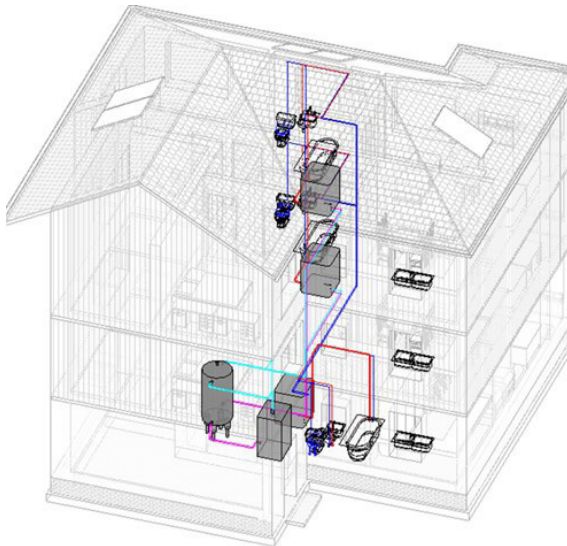
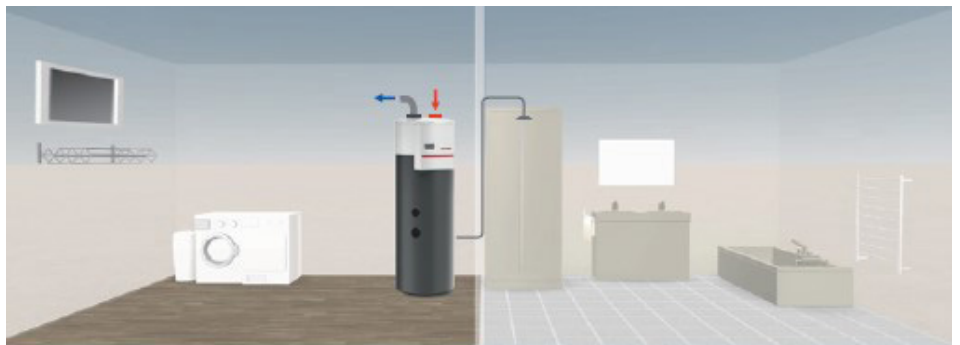
Top: (Fig 1) Internal heat pumps for small apartments; Ochsner
 Middle: Heat pump for a flat in shared loop scheme on left (by Kensa) and shared loop design (by Luths)
 Bottom: Communal ASHP heating for North Glasgow Housing Association
 Left, roof top ASHPs. Right, flat heat units ; Luths

There is a point with very dense housing, say over 20-30 dwellings, when a communal plant room should be considered. It can save each flat having a heat pump (say 30 dwellings x 10kW/flat= 300kW installed) with a (say 100kW) communal heat pump instead. This is using an engineering adjustment for ‘diversity’ (essentially a formula to account for not every person running their system at the same time). For multiple high-density housing this is ultimately cheaper for the installation cost than shared loop or individual heat pumps but needs good design and installation.

Conclusion

Many of our European /Scandinavian countries have been using heat pumps for decades. There are over 190 million heat pumps installed annually in the world. However, gas central heating has been so cheap it is going to take concerted effort to transition to a cleaner solution.

As we look at options, it matters less what the actual make of heat pump is, but by far the biggest factor is specifying and installing the system properly. The most suitable option will depend on the specific needs and characteristics of the home. The first step is to reduce the demand – any fabric improvements will reduce your bills, whether you stay on gas or move to a heat pump. To make an informed decision, it is important to consult with a qualified specialist, who recommends the best heat pump option for you. ■



SEDA Education Group

Nick Domminney

Last year SEDA held a couple of Gatherings from which arose six Groups, convened to develop SEDA policy and understanding of Education, Health, Retrofit, Materials, Degrowth and Planning. The following four articles represent a snapshot of some of the preoccupations of the Education Group, following discussions on their new Basecamp online forum.

Environmental education is, of course, a very wide remit so, early on, the Group agreed to first look at their own teaching of architecture and architectural technology. It was agreed that SEDA could liaise with RIAS and help to signpost existing resources for this area and this is something for the group to work on. Once this has been tackled the group will be in a position to look at other areas such as environmental education in schools and through craft training.

The following thoughts about architectural and architectural technology learning are by no means a comprehensive review, but do highlight key areas of concern. The bodies which oversee teaching of these disciplines are beginning to recognise designers' responsibilities for health and life safety. But their latest reforms, out for consultation, fall short in delivering proven regenerative design. The Group may engage SEDA in the debate as to how architects and architectural technologists tackle these enormous challenges. Coming SEDA magazines will also run reports from other SEDA Groups, so watch out! ■

Some Preoccupations: RIAS Education Committee

Kathy Li BArch Dip Arch RIAS & Miranda Webster DipArch, ARB, RIAS, FRSA (Partner at Cameron Webster architects) both Lecturers / Stage leaders at Mackintosh School of Architecture, Co-Founders of Missing in Architecture, co-chairs of RIAS Education committee

The RIAS Education Committee was recently resurrected from dormancy by a working group steered by Ruth Rodgers-Maclennan and recent chair Fionn Stevenson, with a remit to look at the following:

- Schools + Practice Relationships - including student and professional mentorship
- Curriculum Delivery - including climate education and the ARB's proposed education and training reforms
- Events + Collaborations - engaging the wider public, lifelong learning through CPDs etc.

Members come from all sections of our profession from across Scotland, and comprises educators, heads of schools, practitioners, PG/UG students, Part 3 students, APEAS and Professional Studies Advisors (PSAs).

Following a successful, sociable, and much needed AwayDay in Edinburgh, the RIAS Committee provoked a series of questions which we aim to explore further. Our focus is the connection between practice and academia in upskilling our profession, mentoring, meeting the demands of the climate emergency, retrofit, decarbonisation and RIBA/ARB regulatory reforms. What are practices looking for in the skills of newly educated students? What expertise can professionals share with academia? How can the RIAS

support, facilitate and promote CPDs, mentorship etc., developing the RIAS as a key hub. There is plenty of knowledge which can be synchronised without reinventing the wheel. Are the ARB/RIBA reforms opportunities to do things differently?

There are many challenges and changes for our profession to tackle. As we look to develop the committee activities, we welcome SEDA members and RIAS Chapters who are interested in contributing and shaping our work. In particular, how can we develop a network of diverse and vital membership? ■

Image:
Students learning earth building techniques; David Seel



What are the skills gaps in staff delivering Architectural education?

Professor Fionn Stevenson

I have had a passion for promoting sustainable design via my teaching of architecture for over 30 years in many different schools of Architecture in the UK and abroad. About a year ago, I wrote a short piece on the state of architectural education in the UK for this magazine – the following is a quick update on the results of the architectural education staff skills survey I was involved in setting up.

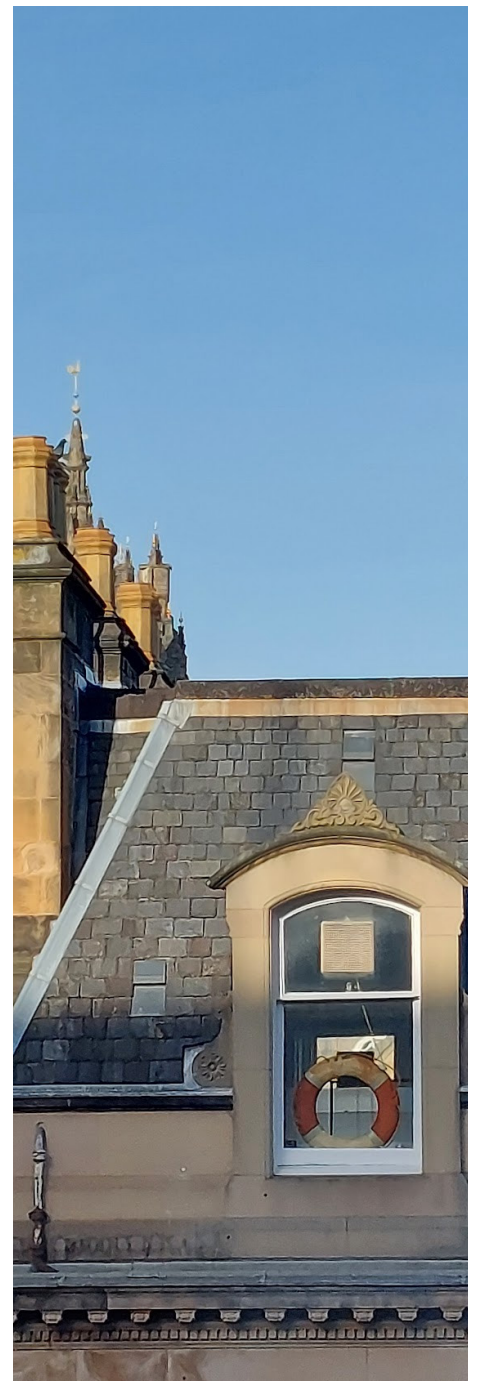
The RIBA Skills Mapping Survey-Phase 1 was co-sponsored by the Standing Council of Schools of Architecture UK (SCOSA - representing 64 Schools), the Royal Institute of British Architects (RIBA) and the Architects Climate Action Network (ACAN). The survey was carried out in 2021 and received response from 58 of the schools. The report on the outcomes provides a first national overview of staff climate literacy skills for architecture. The report shows what levels of awareness, understanding expertise currently exist in schools in relation to validation requirements and was published for all schools in October 2022. The intent of this work is to help in mainstreaming climate literacy in all architecture schools using the RIBA Climate Literacy Knowledge Schedule as a basis.

The eight areas defined for reporting were according to the Schedule: Global and Built Environment Climate Fundamentals, RIBA Sustainable Outcomes and Common Threads, Human Factors, Circular Economy, Energy and Carbon, Ecology and Biodiversity, Water, Connectivity and Transport.

Most schools said they had some awareness and knowledge of Climate Fundamentals, Sustainable Outcomes, Human Factors and Energy and Carbon. However, schools need to develop more expertise primarily in relation to financial risks and net zero economy, life cycle costing, investment and procurement, biophilic and sensory design, resource efficiency and geographic implications, whole life carbon, offsetting, and the general heading of 'Water', 'Connectivity and Transport', and 'Ecology and Biodiversity'. This is exactly what SEDA promotes - can we help here? Schools also reported having more staff expertise available for teaching at Post-graduate/Masters level (RIBA Part 2) rather than at the Undergraduate degree level (RIBA Part 1). The worry here is that students may not be getting teaching across all themes at degree level, when they should, at least to introduce them to the concepts.

The aim of the overarching interdisciplinary Climate Framework within which the RIBA Schedule sits, is that all staff should have at least an awareness of each heading within the Schedule, and additional knowledge and expertise where necessary. The next step is to support schools in enabling this to help inform their teaching. The RIBA and the Royal Institute of Architects in Scotland also have a key role in supporting this through their CPD training programmes.

Image:
Architecture needs rescuing....;
Fionn Stevenson



Eco-architecture teaching: how to respond to being in demand

David Seel: Teaching Fellow, Edinburgh School of Architecture & Landscape Architecture (ESALA)

Having taught ‘sustainable design’ at a Scottish University for several years, I have seen a recent increase in the share of students who are keen to find out how to really put into practice greener and low carbon design. Other articles here talk about the need to upskill the staff to be able to deliver this, and the student surveys discussed here have highlighted a gap between what students tell us they have learned till now and what we need to deliver. I have also found that, as well as these who are well informed about climate issues from school, another cohort from various backgrounds have not been, or have avoided it so far. So, any new and more thorough teaching needs to cater successfully for all of them, from those potentially wanting to go ‘deep green’ and those who need their knowledge and expectations shifted, while making sure all get the basics on how they could design in a lower impact way.

In recent years, Scott McAulay in his Scottish Anthropocene Architecture School, and StuCAN (ACAN’s student wing), have put together surveys at a national level and in individual schools on what students have been taught. A 2021 survey at ESALA in Edinburgh found that, at best, 30% of architecture students come out of their teaching feeling they are well prepared to enact sustainable design in practice, and another 40% feeling they were ‘somewhat prepared’. I suspect this is an improvement in recent years, and one of my fellow teachers says he sees there have been more opportunities to focus design courses on issues like retrofit or

circular materials. This might mean things are a bit better than overall, as in a wider StuCAN survey asking for a simple Yes or No, a good 70-80% of students who responded felt they were not properly prepared for tackling these issues.

Like in the wider profession, there is a need to make sure people address these issues in contextually broad terms, and are furnished with technical ways to assess and measure performance, whether carbon metrics or something more holistic. Up until recently the subject matter was generally taught in ‘technical’ parts of the course, or was made as an ‘option’ at later stages for just a few to examine in more depth. In my new role as a Teaching Fellow, I am now involved with helping undergrad teachers not only guide students how to use what they learnt in the ‘environmental’ parts of the course in the ‘design’ parts, but also use it to drive the focus of projects. It is a challenge for schools to rethink how to make these issues more central, in an already long list of requirements. And we need to ensure we avoid just ‘bashing young people on the head’ with it, which can lead to burnout or eco-despair. I am sure we can, with co-operation round the country, find ways to inspire and engage: it’s what students are asking for. ■



Images:
Students learning earth building
techniques; David Seel

Architectural Technology students demand skills to tackle the climate crisis

Magdalena Blazusiak, MCIAT: Knowledge Exchange Coordinator for CIAT Scotland East, Senior Architectural Technologist at [jmarchitects](#)

Architectural Technology degrees provide a diverse range of knowledge including broader aspects of sustainability, from digital twinning and BIM deliverables as means for decarbonisation of the built environment, to knowledge of building physics, regulatory and legal aspects of construction.

Honours degrees in Scotland show a good level of acknowledgement of the requirement for retrofit in the main design studio projects, exploring adaptive reuse and circularity. Building pathology and conservation units give a taste of approaching existing buildings. Sustainability is spoken about often but not fully appreciating insurability, regulations, or supply chain limitations. A large bulk of learning is, however, theoretical, so one may ask, how can young people be made confident of their knowledge if the learning is done in isolation from the industry?

QAA Subject Benchmark Statement for Architectural Technology

All accredited Architectural Technology degree courses are required to be compliant with the QAA Subject Benchmark Statement (SBS). The latest revision puts emphasis on the academic-industry partnership. It does not, however, propose any tangible objectives for educators. It is up to individual course leaders to decide on the most appropriate level and model of delivery. The outcome will be largely dependent on their connections with the industry,

involvement in the Climate Emergency Action and capabilities of students, to deliver well balanced programmes providing graduates with confidence in core curriculum knowledge. With such a broad range of fundamental criteria, the climate emergency deliverables may be considered of secondary importance or perhaps deferred to post-graduate level. Even though SBS reads well with the many aspirational targets, it doesn't seem to apply to HND and HNC degrees, where support for those early careers could help to mould behaviours and establish robust carbon literacy.

Conventional thinking of the role of the architect, technologist, surveyor, and engineer makes delivery of multidisciplinary projects difficult in the timeline of the individual degree, even though all the disciplines are now linked by the common path of carbon accounting and environmental deliverables. The early multidisciplinary collaboration supported by ad-hoc teaching by graduates could assist in the delivery of holistic teaching programmes. This can be especially beneficial for HND and HNC students, constrained by the limited time they spend in education, improving their confidence, introducing them to professional networks and assisting in raising awareness of the challenges faced by the industry.

CIAT support

Presence of the Chartered Institute of Architectural Technologists is manifested in academia, but chartership requires

a certain level of perseverance upon graduation and is not always a natural step in the individual career. Unlike architects, AT's route to chartership is not as linear, not always a requirement and too often underappreciated by the employer. The Institute can provide support rooted in peer learning and have a role in ensuring skills of members to assist in mitigation of the climate emergency. However, if learning could be supported by a diverse membership programme of CIAT, CIOB, RICS and other institutes, graduates would take on their professional roles with more confidence, regardless of which part of the construction industry their professional journey takes them to. ■



Image:
Teaching at Robert Gordon University; RGU

Satisfying working

Kirsty Cassels, Designer & Builder

From teaching designers how to build, to teaching builders how to design, I've managed to go full circle and now promote the craft of design and build.

What do I mean by design and build? I don't mean the turn-key, under one roof, one-stop-shop service provided to a client to reduce their input and management. It is not about combining various job roles and professions to try and streamline a building process.

What I mean by design and build, is the opportunity to commit to and engineer a certain design into being, while still allowing freedom and play within the build of that project, to further design, problem solve, tweak, experiment and elaborate on the initial design.

These opportunities to continue designing as the build of a project comes into being, can bring about little moments of genius that can dictate decisions. Details can be seen, touched and felt and then refined while they are happening or as a direct result of another decision.

Prior to the COVID-19 pandemic I was struggling with my title, with my job roles and responsibilities, the definition of what services I was trying to offer the world, and what I needed to achieve. While I was confident in my general building skills and knowledge, I didn't feel I could stake claim to any particular trade, as I hadn't trained traditionally, picking up all my known skills through years of volunteering and hands on working opportunities.

I was fortunate to gain a place on the Princes Foundation's Building Craft Programme during the pandemic. You have to be NVQ level 2 or equivalent to actually get a place on the course. I joined that as a multi-disciplinary student, with the intention of either choosing stonemasonry or joinery/carpentry as my trade. Two days into the course I knew it was carpentry for me!

That course provided opportunities to work on restoration projects, post and beam timber framing, sash and case window repairs, and much more. By the time I left, I felt more confident in my trade, but knew I had a lot ahead of me to still learn.

After this, I spent a year in the TV and Film industry working as a carpenter on a high end TV series. This was eye opening, and working alongside such talented joiners taught me a lot.

I find myself back teaching and facilitating on the Princes Foundation course, and wholly encouraging the design and build ethos, assisting all trades and disciplines to work together to problem solve and adapt the design as the project progresses. It's a far more satisfying way of working for those who relish the craft of building. It truly is design and build. Not many projects are lucky to have this setup so we are making the most of it!

You can follow my building progress on Instagram @building_cassels and my design projects on @creative_cassels or check out my portfolio at <https://www.creativecassels.com/> to get in touch. ■



Images:
Top: Douglas Fir post & beam frame in Glenrothes for Thomson Timber; K Cassels
Bottom: Restoration of Victorian glasshouse in Glasgow; K Cassels

Greenwashery

Nick Domminney

1. UAE TBA

"I welcome the appointment of Dr Sulman Ahamed Al Jaber... (who) has shown leadership in climate change investment and innovation... through his work as the UAE's special envoy on climate change.."

Tony Blair welcomes the appointment of CEO of Abu Dhabi National Oil Company as president of COP28. (Tony Blair Associates (TBA) is advisor to the Abu Dhabi sovereign Wealth Fund.)

2. Oil rigged

Danish oil giant, Orsted, has signed a contract with the Natural History Museum in London under which the Museum is not permitted to *"make any*

statement or issue any publicity which may reasonably be foreseen as discrediting or damaging the reputation" of the company. An example of the company's approach can be gleaned from a 2016 exhibition which, along with a beautiful photograph of a cormorant hunting fish below an offshore rig, is the caption: *"Drilling for oil is not generally considered beneficial for wildlife, yet oil rigs can provide shelter and a rich food supply for many animals including Brandt's cormorants."*

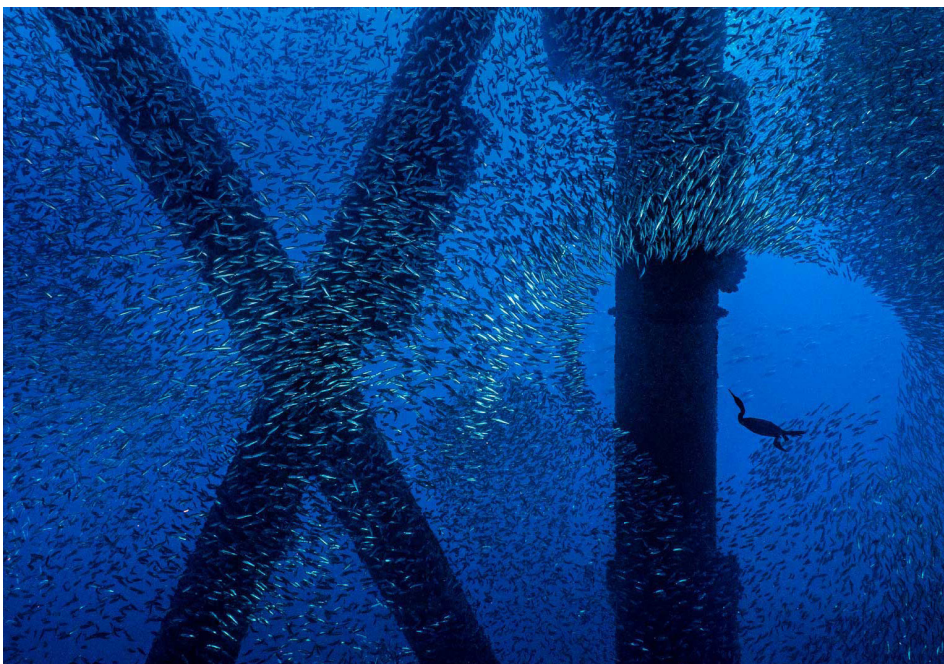
3. INEOS innit

Cycling's green innit? But hold on a minute! Australia's top peloton team is sponsored by: INEOS, Total Energies; the governments of UAE and Bahrain and Kazakhstan's national wealth fund.

The UK's cyclists are not averse to sports washery either. Previously Team Sky it is now sponsored by gas fracking INEOS. While British Cycling now has a sponsorship deal with Shell UK, who assured doubters that it is committed, "to help British Cycling accelerate its own journey to net zero."

4. Lovin it!

Renewables greenwash at Macdonalds Toryglen Glasgow. Check out the PV's. Guess which elevation is north!? (it's the bottom image) ■



Images:
Bottom, left: Brandt cormorant hunts;
Alex Mustard - Minden Pictures
Bottom; right: Renewables greenwash at
Macdonalds Toryglen Glasgow.

Trees, Planning and Development in Scotland

University of Stirling
19th May 2023,
8.45am to 4.30pm

How can the planning system, policy and practice help protect and expand our trees and woodlands which make up our Urban Forests?



Trees & Design
Action Group

Lead Partners



Arboricultural
ASSOCIATION
trees.org.uk



Central Scotland Green Network



Green
Action
Trust



Institute of
Chartered
Foresters



Trees & Design
Action Group

#01

10 STEPS

TO MASS TIMBER CONFIDENCE



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Glulam, but not as we know it, Jim

Peter Wilson: architect and founding director of the Mass Timber Academy Ltd.

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Glulam, or glue laminated timber to use its Sunday name, is undoubtedly the best known and most long-established of the solid laminate (glued) timber systems. There can be few architects or structural engineers who haven't heard of it - and have likely even used it in its basic post and beam formats, i.e. as linear alternatives to steel or concrete beams, columns and lintels.

Modern Glulam technology has been established since 1906 when Karl Friedrich Otto Hetzer not only formed the first curved Glulam elements, but patented this system for large span domed structures. Manufacture quickly spread to Sweden and from there to the United States. Europe was not slow to respond to the potential of this new product either and today there are literally hundreds of manufacturing facilities spanning the continent and indeed the world. Everywhere that is, except the UK and although there are a couple of smallish producers in the South of England, we still import almost all of the Glulam we use from the European mainland and Scandinavia.

The Glulam available to us today has come a long way since Hetzer's early experiments, and while standard sections and lengths of straight elements are available here from importer's stock, the bigger picture is one of bespoke design and production for ever-larger and more complex buildings emerging around the globe. This is a highly specialised area of fabrication in which architects, structural

engineers and seriously experienced companies such as Blumer-Lehmann (Switzerland), Hess Timber (Germany), Simonin (France) and Wiehag (Austria) work in tandem. Double-curving Glulam gridshell structures are now almost commonplace, from domestic scale such as Gianni Botsford's exquisite house extension in Notting Hill to the massive and highly complex interlocking roofscape of the Bunjil Palace in Melbourne by the innovative multi-disciplinary Australian design studio, FJMT.

Perhaps the most recent, highly publicised example in the UK is the Cambridge Mosque by Marks Barfield Architects, but there is surely room for more inventive possibilities, as architects and structural engineers here become more familiar - and more creative - with ongoing technological developments in this field. The two things that have changed perceptions of what is possible in this area of engineered timber are: the large-scale offsite manufacture of one-off structural engineering solutions and parametric design that link the architectural/engineering process directly to the production facility's automated fabrication equipment.

But the modern Glulam story is not all about complexity of production, it is also one of scale. The ability to create massive glue laminated structural elements has contributed not only to the global advance of ever taller timber buildings of 20+ storeys, but also to the immense scale of facilities such as the currently emerging

'World of Volvo' museum and exhibition venue in Gothenburg by architects Henning Larsen.

And this is just the new world of Glulam formed from softwood: the hardwood Glulam story is still arguably at an earlier stage, but the Warner Stand at Lords Cricket Ground tells of things to come - 25m beams formed from American white oak with tapering cantilevers over 12m in length. Making Glulam from UK-grown hardwood is unquestionably a more fruitful commercial opportunity that recent experiments here to use this material to form CLT. ■



Images:
Top: House in a Garden, Notting Hill; Gianni Botsford Architects
Bottom: Cambridge Mosque; Marks Barfield Architects



The countryside - who pays?

Helen Todd, campaigns & policy manager, Ramblers Scotland

It's official – getting outdoors, whether for a gentle woodland stroll or an adrenaline-fuelled adventure, is good for you! More and more evidence is showing what we all instinctively know to be true. There are incredible benefits to health and wellbeing from being in the natural environment.

And Scotland's a great place to get outdoors not only as a wonderful country to visit and enjoy, but also a beautiful place to live.

Clearly all this activity needs investment to ensure people enjoy themselves without damaging the environment or placing too much pressure on local communities. But who pays for this investment?

Land Conversations

This question was the topic of a SEDA Land conversation held on 13 February 2023. While no clear solutions were identified – not a surprise given the straightened times we're living in – there was a wide-ranging discussion about the various issues. We also enjoyed three beautiful interludes from artists who feel passionately about rural Scotland, relating to the themes of the conversation.

Our tourism sector is firmly based on Scotland's natural assets, along with our distinct cultural heritage. Over half of all tourists to Scotland cite the landscape and scenery as their prime reason for coming here, with a third mentioning the history and culture.

At a population level, it's clear that Scotland really needs to improve on levels of public health, especially for those communities facing barriers to participation. A growing interest in the effects of social prescribing has much potential, taking advantage of our natural resources. It's clear we should be doing all we can to encourage more people to get outdoors, whether with friends and family, on holiday or as part of a green prescription.

But while going for a walk is free, all this activity, from both visitors and residents, still needs infrastructure and management. This means paths, signs, ranger services, car parks and toilets. It may also mean investment in road maintenance and places for campers and campervans to pull in overnight. Without management, there's an incredible burden placed on those who live rurally.

This extent of this burden was made particularly clear in 2020 as lockdown ended and people flocked to the countryside. Very little management was available due to the pandemic and countryside staff having been in lockdown themselves. When a national visitor management strategy along with government investment arrived in 2021 and 2022, the situation was hugely improved.

This experience shows that the outdoors needs continual investment – and it pays this back many times over, both economically as well as in our better

health. For example, walking tourism alone is worth around £1.26 billion a year to the economy, supporting thousands of jobs across Scotland. But in these difficult economic times any funding needs to be effectively and efficiently used.

Longer stays, better quality

Communities are already getting involved in taking on services and facilities from toilets to petrol stations and vital local shops and post offices. The tourism industry itself is adjusting to the new environment it finds itself in, with a focus on lower impact trips including longer stays and more out of season activities. Agritourism also has a vital role in providing not just healthy food but also education on how farms work. It also supports a range of businesses including accommodation providers. But there are also places where there simply isn't the capacity to manage the level of visitors – people have jobs and busy lives already in areas of sparse population.

Local authorities are already struggling to fulfil their statutory duties, never mind other important priorities. National government does provide some additional funding to support visitor infrastructure or ranger services, but it's only available on a year-to-year basis. There's a clear need within the visitor management strategy framework to find ways of making funding streams coordinated and sustainable.

Images:
Below left: Agritourism
Below right: Boots & Beards

Who pays?

Could a visitor levy, or tourism tax, be used to ensure a flow of funding directly to communities to support better facilities? Or would a 1% increase on VAT be better? While nobody likes to pay for car parking, there is evidence that when people know the money is being invested in local facilities they are far happier to pay. The same principle is likely to follow for community-led initiatives. And should an element of future agricultural funding programmes provide funding for these facilities?

But how would larger infrastructure projects be funded? An audience poll named better public transport as one of the key ways of encouraging more visitors

to go to the countryside. That would clearly reduce the tourism footprint and be far more sustainable in the long run. But it takes time to embed bus and train routes which are regular enough to tempt people out of their cars, and long-term funding is always an issue.

One aspect that everyone agreed on was that ranger services are a vital part of the solution. They make sure visitors and residents alike benefit from our great outdoors and our tourism industry. Rangers look after the environment and run green prescription activities. They engage with visitors to make them aware of their own responsibilities, helping local residents to manage seasonal influxes. They also play an important role in early interventions which can diffuse situations

that otherwise might end up with police action. A range of organisations have ranger services, including local authorities and national parks, NGOs, landowners and even community organisations.

Is there a role here for Public Health Scotland to put its hand in its pocket to provide rangers, given the proven benefits to public health?

Overall, the view from the conversation was that visitors made a positive contribution to the local economy and culture. However, long term, sustainable sources and flows of money from all levels into rural infrastructure need to be clarified and coordinated. Otherwise, Scotland runs the risk of killing the golden goose. ■



Scotland's Fair Share: the potential of solar energy in Scotland

Colin Porteous and Gloria Lo

The title of this article is that of a solar-focussed Scottish Parliamentary debate held on 25th May 2022. Fergus Ewing, former Minister for Energy Enterprise and Tourism, and from 2016-2021 Cabinet Secretary for Rural Economy, introduced the session. In particular, he cited a 4-6GW target for solar photovoltaic (PV) generation, including up to 5MW on rooftops. After nine other MSPs had spoken in support of such ambitions, the debate was summed up by Patrick Harvie, since 2021, Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights. His first responsibility inevitably implying a considerably wider remit than the particular topic of the debate. This aspect, contrasting with its particular emphasis on solar PV – to the exclusion of solar thermal potential – and its proximity to the broad eco-agenda of COP26 hosted in Glasgow 6 months previously, justifies us turning initially to such basics as 'sustainability' and 'climate' justice'.

Brundtland to Glasgow

The COP (Council of the Parties) series stems back to the 1992 Rio Earth Summit, in turn preceded by the 1987 Brundtland Report, 'Our Common Future' (by The World Commission on Environment and Development, chaired by the then Norwegian Prime Minister, Gro Harlem Brundtland)¹. 'Our Common Future' loosely defined the term 'sustainable development' as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"; the

Earth Summit published 'Agenda 21, The United Nations Programme of Action from Rio', introduced by the Rio Declaration on Environment and Development, with 27 Principles – 'sustainable development' to the fore².

Between 'Our Common Future' and the Rio Earth Summit, economist Herman E Daly and philosopher John B Cobb Jr. published 'For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future'³. Daly and Cobb preface the word 'sustainability' with 'ecological', and also posit consideration that *"sustainability is really justice extended to the future"*⁴. This was prescient, given the weight accorded to the mantra 'climate justice' in recent COP meetings. Notably, Daly and Cobb also challenge the lack of distinction between 'sustainable development' and 'sustainable growth' in 'Our Common Future'. They argue that sustainable growth (based on quantitative expansion) is by its nature self-contradictory, while 'sustainable development' (involving qualitative change) requires distinct definition in operational terms⁵. Such terms effectively evoke Rio's 27 Principles. Ironically, perhaps, other respected commentators such as Martin Pawley argued that 'sustainable development' was also an oxymoron. Despite such critique encouraging alternative definitions, the original term with its Brundtland descriptor survive to the present.



Image:
Previous: COP26; Ran Boydal

Climate justice

Clearly, the potential of solar energy in Scotland must fit within the wider context of ‘climate justice’ and ‘ecological sustainability’, the latter’s adjective reflecting a primary natural function of the sun, that of photosynthesis, before we come to renewably reducing the energy loads of the built environment. And although a parliamentary debate is inevitably confined, nothing in the above title suggests that its focus requires to be narrowed solely to solar generation of electricity. Indeed, solar thermal technology applied commercially to buildings dates back to the late 19th century, whilst although Edmund Becquerel discovered the photovoltaic effect in 1839. Solar PV did not become commercially viable until this century. Moreover, other neighbouring European countries of similar northerly latitude to Scotland are employing large-scale solar-thermal installations with underground seasonal hot water storage, and linked to district heating networks augmented by indirect solar fuels – biomass such as wood chips/pellets, or oils from crops such as rapeseed or linseed⁶. Parallel to such infrastructural set-ups, other continental neighbours, Switzerland a good example, have managed to twin the German Passivhaus methodology and certification with both passive and active solar thermal techniques, as well as aesthetically pleasing building-integrated PV.

Such exemplary projects have been aired at recent SEDA Solar seminars, which

follow on from the activities of the former Scottish Solar Energy Group (SSEG) with the Scottish Institute for Solar Energy Research (SISER); these have had specific relevance to, and provided consultation and collaborative input to the Energy Technology Partnership (ETP) report⁷. This then fed into the debate through the Science and Technology cross-party group mentioned at the parliamentary debate of 25th May 2022.

Solar Scotland

MSP Clare Adamson cited Prof Neil Robertson (University of Edinburgh), firstly for his work on perovskite solar cells and their potential, secondly for the 19th May 2014 conference held at the Scottish Parliament ‘Presenting the Vision’ to disseminate ‘Solar Energy – A Viable Contributor to Renewables in Scotland’, plus a preceding October 2013 Seminar & Workshop held in the Scottish Universities Insight Institute (SUII), University of Strathclyde. The ‘vision’ of both events, with SSEG involved alongside SISER, embraced passive and active solar-thermal alongside PV.

Similarly, MSP and Conservative Leader Douglas Ross cited AES Solar, and its founder George Goudsmit’s “Queen’s Award for Enterprise” (AES panels used at the Scottish Parliament’s own building); and also mentioned Josh King, formerly of AES and now Vice-Chair of Solar Energy Scotland. Both George Goudsmit and Josh King have been active members in the former SSEG and now SEDASolar.

What Douglas Ross did not specifically mention was that AES’s business for many years was almost entirely based on solar thermal applications, or that such technology remains eminently viable for countries such as Scotland from a climatic viewpoint. The main challenges with large-scale solar-thermal applications linked to district heating, for example, as in Denmark and Sweden, are primarily political, and funding packages can be complex, depending on particular national circumstances. Their potential benefits, however, would help to secure a more holistic and more energy-resilient solar future for Scotland⁶.

Unfortunately current political momentum is directed to an all-electric heating future, with major reliance on heat pumps. Although these have a respectable history applied to housing (to at least the mid-1950s), their coefficients of performance (COPs) vary significantly, as do their costs. Further, Scotland/UK lags well behind continental neighbours, who again favour district schemes – commonly with deep-bore, ground-source heat pumps (highest COP), even though a ‘district’ may be confined to a single block of flats. From a renewable energy (RE) viewpoint, it is tempting to think of on-site RE matching the demand for at least the electricity from the grid required to run the heat pump(s). There are many caveats to such a notion, however, not least daily timing of demand versus supply. Thermal upgrading is also likely to be required to existing property so that the energy load is compatible with the output of the heat pump, and the



architectural configuration relative to solar geometry may be problematic.

Renewable electricity grid?

Overall, an electrical grid that is entirely sourced from RE remains a distant nirvana, and so the more heat that can be distributed directly from local RE sources, the greater is the chance of greater energy-resilience with lowered carbon emissions. Meanwhile, the media and politicians tend to give the misleading impression that our electricity grid is already 'clean' relative to carbon emissions. Even at times when Scottish renewable generation may come close to theoretically meeting national demand, grid-export will reduce its uptake; Scotland also remains reliant on present nuclear energy. Renewable electricity has justifiable traction relative to electric vehicles (EVs), of immediate air-quality benefit, but not for near-universal use of electric heat pumps versus greater reliance on infrastructure that includes significant delivery of renewable heat. Recent statistical data for heat demand in Scotland, although falling, show this to be still more than twice that of electricity⁸. Other data collating annual domestic heat demand for all fuels, gas dominant⁹, stress the challenge of zero carbon, low energy homes; thus reinforce the case for renewable heat generation to complement realistic growth in renewable electricity.

Zero carbon buildings in particular, with unregulated everyday usage of power for white goods and other electrical appliances, involve addressing an interactive range of influences:

Images:
 Previous: George Goudsmit's "Queen's Award for Enterprise" - flag-hoisting ceremony ;
 Mark Richards, Aurora Imaging <https://www.auroraimaging.eu/>
 Below: Sweden-Falkenberg_5,500m2_flat-plate_collectors_(visited_by_SSEG_1996)

- nature of the building envelope – geometrical and constructional – and its potential for solar/thermal upgrading (e.g. Passivhaus standard);
- influence of plan and section, including opportunities for building-integrated RE generation (e.g. solar PV and solar thermal);
- practicality of necessary changes to existing servicing systems;
- opportunities for economies of scale – district heating and other communal servicing such as laundries and drying facilities.

Moreover, we require a much tighter definition of terms such as 'zero carbon' if it is to be a serious and practical political and technical target. ■



Notes

1: 1987, 'Our Common Future', Oxford University Press.

2: 1992, 'Earth Summit Agenda 21', UN Department of Public Information.

3, 4& 5: 1989, 'For the Common Good', Beacon Press, Boston, Ch 7, p145, Ch 3, pp71-76.

6: 2022, Lo, G.J.'A Critical Reflection on Energy Supply in Scotland', RIAS Quarterly, Nov-Dec.

7: 2019 October, Robertson N., Jain S. Williams, S-M. with input from SSEG by Wong P-W & Lo G.J. 'ETP Review of Innovation in the Scottish Solar Energy Sector'.

8: 2020, Matthews, P., Scherr, I. 'Annual Compendium of Scotland's Energy Statistics 2020, Scottish Government (data 2018: heat 50.3%, electricity 22.1%, transport 24.5%, other 3%).

9: 2022, Kelly, M., Georgiev, M., Murray, C. 'Expanding Scottish energy data – heat', Ricardo Energy & Environment (over 13,000kWh annually per property; over 12,000kWh for gas)



Thoughts from the Chair...

Catherine Cosgrove, SEDA Chairperson

The Scottish Government often tells us that we have world leading climate change policies. We'll soon be required to build our houses to a Scottish equivalent to the Passivhaus standard. No-one knows what that will be, because we haven't worked it out yet. But new houses represent less than 1% of all housing in Scotland. The much bigger problem is that we have to improve our existing homes to make them more energy efficient, healthier to live in and to be climate resilient. Retrofit of the homes we already have, needs to be the focus of our effort.

No-one should underestimate the size of the challenge to retrofit every one of our houses. There are over 2.67 million dwellings in Scotland. Their constructions vary depending on when they were built, along with the materials and workforce that were available at that time. Many will have been altered over their life, possibly several times, with new constructions introduced. The condition of each home will have been affected by many factors and even houses that look the same externally can perform very differently due to their occupants' lifestyles. All of these issues play a role in how a building performs and need to be considered before looking at what forms of retrofit are suitable. In short, there is no one size fits all solution.

There doesn't seem to be a clear plan as to how we can manage a national retrofit programme. There is no true understanding of how many housing types are present in Scotland or if there are quick wins available in tackling some types first. There is no industry wide training strategy, one that would show all trades how their existing skills can be used in this retrofit drive. Retrofit isn't taught in architecture schools. Few of the Building Standards set out acceptable standards of retrofit work. Any grant funding available for retrofit comes tied with so many strings that they almost guarantee failure of the project.

What can we do about this? Many SEDA members have retrofit experience and are happy to share their knowledge. Our design guides and publications are a good source of information, as are our seminars and events. But our reach and influence is quite small. The question that we have to ask ourselves is whether SEDA can be the catalyst to create a bigger impact. Do we focus on key areas and aim to make a targeted difference or do we aim bigger and create a national retrofit strategy? We have discussed these in recent months and are trying to find a way that SEDA can make the most impact. If you would like to contribute to this process, please get in touch with us at info@seda.uk.net.