



Elisabeth Marlow

What role can engineers play in the push towards resilient sustainability? Dr Elisabeth Marlow shares her thoughts with **Helena Russell**.

On the day I interview Elisabeth Marlow, we're both at home trying to keep cool with blinds down and windows wide open; a scenario which turns out to be a fitting backdrop to our conversation.

Marlow is an associate consultant in sustainability at Cundall in the UK and has strong views about how urban communities need to adapt to improve their resilience to climate change – and what engineers can do to assist them. The impact of extreme heat is something we have to urgently address, she says; up to now the focus has mostly been on flooding and other types of extreme weather.

Her career journey so far has brought her into direct contact with communities for whom extreme heat is a daily challenge – she spent a period living and working in the Middle East and was involved in the development of the Greater Muscat Structure Plan. In her current role, Marlow is determined to use that experience to promote greater understanding of the value of resilience.

But she feels that structural engineers should have a stronger voice in discussions about climate resilience, and as an advocate of multisector stakeholder engagement, she aims to champion this.

Engineer or architect?

This disconnect might explain why it took Marlow some time to identify what she wanted to do. As a child who played with Lego, she could have been an obvious candidate for engineering, but it wasn't as simple as that, she recalls.

'I grew up in Brighton and was fascinated by the underside of the pier. How does it come out of the sea and create a platform? Brighton also has loads of Georgian architecture and these curved facades really interested me. So there were quite a few things that I found visually appealing, and that I'd started to question.'

With an unconventional mix of A levels, including art and geography, she did not follow the standard path – despite making bridge construction the subject of her art A level dissertation. 'I had this question – am I an engineer or am I an architect?' she recalls; a course in architectural engineering at Cardiff University allowed her to explore both, giving her longer to make up her mind.

'The degree made sense to me. We had part architectural modules, part building services modules; how do buildings work and create comfort for people?' she says.

A year's placement at Price & Myers taught her how to apply what she had learned: 'How to do calculations, how to make a wall stand up, how you size a foundation – and all that sketching started to come into play,' she recalls.

Elements of the architecture modules piqued her curiosity: 'I remember discussing that housing estates might be more susceptible to crime due to how they were designed, and learning about ecological architecture – that was a bingo moment for me,' Marlow says. She recalls it crystallising some of the factors that had influenced her development – nature, environment, biology and, above all, the desire to

CAREER MILESTONES

2001	Graduated from Cardiff University with BEng(Hons) Architectural Engineering Joined Anthony Hunt Associates as graduate structural engineer
2002	Joined Buro Happold Associates as graduate structural engineer Awarded Drury Medal and John Barrett Prize for Young International Structural Engineer Design Competition
2004	Joined Price & Myers as structural engineer
2005	Awarded John Barrett Prize for Young International Structural Engineer Design Competition Joined IStructE Educational Trust Became chartered structural engineer
2006	Graduated from Nottingham University with MSc in Renewable Energy with Architecture
2007	Joined The Millward Partnership as structural and sustainability engineer Moved to Glasgow, Scotland, and joined Will Rudd as senior engineer
2008	Became chartered structural engineer Joined IStructE Sustainability Panel Joined Mott MacDonald as sustainability consultant
2011	Seconded to Mott MacDonald in Abu Dhabi as senior sustainability consultant
2020	Completed PhD at Loughborough University on <i>Interplay of decision-making of sustainability and resilience in the built environment</i>
2022	Joined Cundall as associate consultant – sustainability Elected to Vice President of IStructE
2023	Became a Fellow of IStructE



FIGURE 1: Working on the Greater Muscat Structure Plan was a career highlight for Marlow, giving her the opportunity to apply her knowledge of sustainability and resilience directly to a new city urban plan with a focus on renewable technology and the water life cycle

pursue a more sustainable lifestyle. 'We can actually design sustainable buildings, so why aren't we doing it?' she asks.

Passion for sustainability

In the working world, however, she found it difficult to identify a path that suited her – and her continued interest in structures led her to take a job with Anthony Hunt Associates. 'They were working on the

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Eden Project at the time,' she recalls, 'an inspirational structure that does all this natural stuff!' She did not feel ready to commit to a particular career path, given the broad range of her interests. 'I suppose I was having my own confidence crisis!' she says. But winning an award in the Young International Structural Engineer Design Competition in 2002 gave her some validation.

Marlow then moved to Bath to join Buro Happold – in part influenced by her admiration for Michael Dixon, who was president of the IStructE at the time, and partly attracted by the younger demographic and multidisciplinary workplace. After picking up another award in the 2005 Young International Structural Engineer Design Competition, she was invited to join the IStructE's Educational Trust, marking the start of a long involvement with the organisation. In her professional role, as a young engineer who was still developing, she was not comfortable with the disconnect she noted between design solutions and the macro environment. 'I felt like I needed to do something about my ecological perspective,' she says.

Identifying a Masters in renewable energy with architecture at Nottingham University, she decided to study part time, working for Price & Myers at its office in Nottingham to support herself. 'It was a great opportunity that brought me into the world of what we now call building physics – I learned how to design solar panels, what is needed to make wind turbines efficient, and so on. That was backed by an understanding of the context of place, which is quite important for sustainable engineering,' she adds. The value of understanding the local economy and the availability of local materials – and how these might be exploited – all added to the learning.

Marlow joined a small engineering firm – The Millward Partnership – to help it set up a sustainability consultancy, and was encouraged to become chartered. But her work was still dominated by structural engineering, when what she really wanted was to pursue her passion for sustainability and people.

That opportunity came about when she joined Mott MacDonald as a sustainability consultant, and, after working on Sheffield's Building Schools for the Future programme for several years, where she focused on carbon reduction targets, workshops with children – the building users – and sustainable construction, she was offered the opportunity to relocate to the UAE.

Marlow explains that the UAE has a mandatory environmental accreditation

system known as 'Estidama' (sustainability); the Urban Planning Council specifies the Estidama rating that a project must achieve as part of the application approval process. Essentially, sustainability is enshrined in law, she says. 'In the UK, we talk about the 2008 Climate Change Act, but how does that affect our decisions? I'm not sure it does!'

'This was an opportunity for me to bring everything together – my interest in science, my understanding of nature, place and renewable energy – and what about people, how do we engage them? I got a lot of exposure to international projects in the region, working on schemes in Dubai, Bahrain, Qatar and even Iraq.' Over her three-year stay, Marlow was project manager on sustainability services, microclimate analysis, building physics and construction of green buildings.

But after having a baby in 2014, she found herself on a 'self-imposed' career break. At that time, standard maternity leave in the UAE was only six weeks, and she recalls the difficulty of trying to push a buggy through sand on a road with no pavements. She returned to the UK without a job to focus on being a mother and building her own community and professional networks.

Exploring resilience

Knowing that she wanted to further contribute to environmental change, a chance meeting led to Marlow applying for a role as doctoral researcher at Loughborough University. This was the point at which she started to understand the importance of the relationship between sustainability and resilience, she recalls. 'I understood sustainability through a practitioner's lens; what my supervisor introduced me to – as a social scientist – was what resilience means.'

Her PhD examined the interplay between sustainability and resilience in the built environment. 'We talk about 'building back better' but is that resilience? I started to explore how, or even if, these concepts are measured, and how they inform decision making at policy, planning and practice level.' This involved compiling case studies examining sustainability and resilience in three US cities – New York, Chicago and Boston.

One of the main barriers, Marlow claims, is that environmental planning law hasn't really changed in the USA since the 1970s. 'Policy and planning are always out of date; practice knowledge needs to inform them. I found that New York had done this really, really well, creating a climate



WE NEED TO ADVOCATE FOR ENGINEERS TO BE PART OF THE NARRATIVE TO MAKE CHANGE – ENGINEERS ENABLE SOCIETY TO LIVE A BETTER LIFE

change group that committed to '80 x 50' – an 80% reduction in carbon emissions by 2050. Those in governance started to realise that those in practice really knew their stuff, and they said, let's make it 90% by 2050!'

'Once I finished the PhD, I was unemployed for a while. I didn't know where I fitted in engineering as an engineer who is interested in policy. I'm definitely on the fringes now, and policy people mostly employee policy people.'

In 2022 Marlow joined consultant Cundall's strategy and governance team, and an opportunity within the company changed her direction. She was lucky enough to work on the Greater Muscat Structure Plan – something she considers a career highlight – giving her the opportunity to apply her knowledge of sustainability and resilience directly to a new city urban plan for 2040 (Figure 1) that has now received its royal decree.

Cundall's role was to provide a focused spatial development strategy for the 1,360km² metropolitan region, to underpin the Oman National Spatial Strategy, strengthening and promoting sustainable design in the urban environment. This included proposals for an efficient and resilient city-wide utility infrastructure network, with an emphasis on renewable technology and the water life cycle and meeting UN development goals for the next generation.

'It was amazing – seriously, these opportunities do not happen every day. I was able to literally put what I'd learned straight into practice,' Marlow says.

'You're creating a capital city that needs new stuff, and new policy; what do you found that on? So our team worked to create a climate risk map, and a sustainability framework with 108 place-based indicators, and we reconfigured the policy for the city.'

Better, more inclusive decision making

In parallel, Marlow was upping her involvement in the IStructE, and was elected Vice President (UK & Europe). Tanya De Hoog, who became

President in 2024, was instrumental in encouraging her to become a Fellow, something that she believes does not come naturally to women in the industry.

Being VP exposes you to many opportunities, she says. 'I'm still in my mid-40s: if I was to become a board member of a company, it probably wouldn't be until I was in my 50s. So this gave me a platform to experience and learn things which I might not be able to otherwise.'

She is keen to encourage younger people to get involved. 'I do believe in inter-generational decision making, I think young peoples' voices are really important and this goes back to resilience. We need to work with the community because they're actually the ones at risk – we're all vulnerable in different ways.'

Marlow is frustrated that change is so slow. 'Resilience and sustainability are not complicated – I think our habits are the biggest inhibitor and the fact that the policy is so out of date. People don't want to pay for it, so they will go to the bottom line and the bottom line isn't good enough.'

'To me it's about saving lives – going back to why I am a chartered structural engineer – it's about society and protection of the public. Water infrastructure failed in Surrey in 2025, now we're going through a drought in the UK. We're a developed country but some people can't afford food. I don't understand why we aren't applying the lessons set out by Dennis Mileti in his 1999 book *Disasters by design: a reassessment of natural hazards in the United States*.'

There are well-established precedents; for example, the 1995 Chicago heat wave when 739 people died. 'Many of them were living in buildings that didn't have natural ventilation or even openable windows and couldn't afford air conditioning. Power can fail, or people can't afford to pay their bills.'

'Buildings are being designed to conserve heat and hospitals as mechanically ventilated places for the health of the patients. But if you can't open a window, you've got nowhere to go. In heat events the ground gets very hard, and so when it does rain we end up with flash floods. Considering multi-hazard scenarios like these is crucial.'

'We need to advocate for engineers to be part of the narrative to make change – engineers enable society to live a better life, but we're not always valued for it. We should be saying what we need to fund, not leaving it to finance people.'



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