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Do It Now!: Editorial

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Editorial

Do it now!

In this era of *talking* sustainability, you may be interested to hear that G20 countries used nearly twice as much fossil fuels in 2018 as they did in 1990. Over 80% of the energy mix of the G20 is still fossil fuel. The building sector showed the highest emission increase of all sectors in the G20 countries. The G20 countries account for around 80% of global greenhouse gas emissions, as well as around 85% of global gross domestic product. In the G20 countries, around 70% of the effects of climate change could be prevented by limiting global warming to 1.5°C rather than 3°C. (Germanwatch 2019 – Brown to green report: https://www.germanwatch.org/de/17200)

Ireland ranks 48th in the new Climate Change Performance Index. Despite our Taoiseach reacting to this by claiming our greenhouse gas emissions decreased in 2017, the five-year trend is up by 7.5%. (Burck, Germanwatch).

Young people all over the world are asking those in power and authority what they intend to do about this impending catastrophe. We are already feeling the effects of global warming in our climate and weather patterns. We cannot wait until tomorrow … we must do it now and *walk the walk* rather than just *talk the talk* about it.

All of this can be somewhat overwhelming and is a serious challenge. What exactly will our personal and professional contribution be? Every time we board a flight or sit in a car we contribute personally to emissions. Apart from taking personal responsibility we must act as leading building professionals and contribute towards the drive for Zero Energy Buildings. Our contribution individually might not seem significant but if, as a professional community of engineers and building professionals we work together, then we can make a difference.

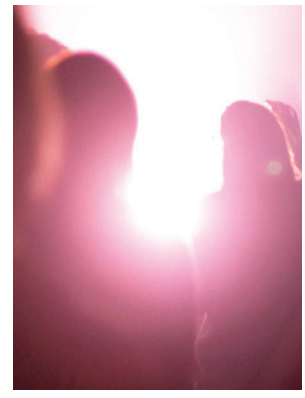
Examples of how members of the building services engineering fraternity are making their contribution are detailed overleaf in this, the 9th edition of the *SDAR Journal*.

Kevin Kelly

A Reader's Guide

Dr Kat Kelly examines in-use energy performance of automated smart homes. This research study tests whether automated demand-controlled heating and ventilation can provide a good indoor environment, while reducing energy consumption in "real-life" homes. A year-long case study was conducted using six occupied, neighbouring dwellings installed with a low-cost automated building control system. The energy consumption figures recorded were compared to the values predicted by the Standard Assessment Procedure and by a Dynamic Simulation Model, and compared to Passivhaus standard. Significant savings have been identified. The results of this study show that an automated control system can lead to very low energy, and hence low carbon homes. This means that such systems have the potential to make a considerable contribution to reducing the carbon footprint of housing stock, and hence to meeting carbon reduction targets.

Dr Julie Godefroy, Technical Manager and Dr Anastasia Mylona, Head of Research, two CIBSE senior technical staff members, evaluate indoor air quality, humidity and thermal conditions in a CIBSE review of recent research and guidance in criteria and solutions. This paper presents a summary of recent CIBSE guidance on health and wellbeing in buildings, including how to define indoor environmental criteria. In a rapidly-evolving field, it also summarises key areas of current research and development, how to evaluate such studies, and what to look out for when reviewing emerging products. The paper focuses on indoor air quality, thermal comfort and humidity, but many of its principles are valid for other aspects of indoor environments. Overall, CIBSE guidance advocates for source control, the precautionary principle and monitoring of building performance in order to avoid unintended consequences.



Stephen Wasilewski, Lars Oliver Grobe, Jan Wienold and Marilyne Andersen join us from the Lucerne University and École Polytechnique Fédérale de Lausanne, Switzerland with a critical literature review of spatio-temporal simulation methods for daylight glare assessment. A well daylighted space can provide a highly satisfying visual environment. However, if that environment causes us visual discomfort, it can become such a nuisance that we, sometimes literally, turn our backs on this powerful connection to the outside world. Given this,

there is enormous value in quantifying the occurrence of discomfort glare within buildings, and in glare models that may guide architects and engineers in design. With the success of climate-based modelling techniques for daylight illuminance, there is now a focus on including discomfort glare metrics in spatio-temporal evaluations. This paper conducts a literature review of research focused on spatio-temporal simulations for glare assessment. While the existing research included in this review outline a wide range of possible methods for spatio-temporal glare simulation, none of the proposed methods offer a path towards a method that is both generally applicable and efficient. The authors conclude that future research should consider the problem from a wider lens, interrogating the required level of detail needed across time, position, and view direction.

Raymond Reilly, a doctoral candidate, looks at embracing digital technology to transform the building services engineering design process. In a case study of an Irish consultancy practice, he examines how digitalisation encapsulates people, processes and technology to improve the design process in Irish BSE practice, thus providing the basis for promoting a sustainable design process during and after design. He concludes that by understanding, adopting and implementing specific digital constructs, Irish BSE practices are in a position to pave the way for an improved design process through digital engineering.

Darren Carthy's paper covers a slightly unusual topic but is published because Ireland has been the subject of scrutiny at European level with regard to some key indicators on the European Skills Index (*European SkillsIndex Technical report*, 2018). Ireland ranks 22nd out of the 28 EU member states for occupational skill mismatch, which is defined as a nation's ability to match skills to the relevant job. In particular, engineering professionals and technicians were identified as a sector with a high degree of mismatch (*Skills challenges in Europe*, 2014). Darren examines this in relation to 109 first-year engineering students at TU Dublin, Ireland and 159 third-year engineering students at KU Leuven, Belgium. He finds that initial data suggests students at both TU Dublin and KU Leuven have a strong preference to work in product-facing roles and a lack of preference for working in client-facing roles. This has implications for engineering recruiters, particularly those recruiting into consultancy, where a large amount of time is spent working with clients. It also has wider implications for the field of engineering as a whole, as engineers spend as little as 7% of their time working on design and innovation, and 60% of their time managing projects and carrying out tests and inspections (Trevelyan and Williams, 2019). There certainly seems to be a mismatch emerging between what an engineer does and what undergraduate engineers would *like* to do.

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The *SDAR Journal* is a free-to-publish journal that is listed in the Directory of Open Access Journals and it is thus free to download papers from it. It is a joint publication between Technological University Dublin and CIBSE Ireland. We have generous support from CIBSE UK, our reviewers, editorial team and editorial board, all of whom contribute their time and input free. We are here to support you publish your insightful cutting-edge designs and post-occupancy evaluations of low energy design.

Your interests are our interests, with the intention of moving engineers from ideologically-based green initiatives towards evidence-based sustainable built environment solutions. Authors will critically reflect on their own work. We want to publish your work if it will help contribute to a more sustainable world. We will help and support you to do that.