

Engineering progress
Enhancing lives

Warming The Next Generation

A contractor's guide to trends affecting the way we heat our buildings





Efficiency from the ground up



The ways in which we heat our buildings has developed significantly over time. Whether for new-builds or existing buildings, of both residential or commercial purposes, there are a variety of spaces requiring specific heating solutions. All of which have varying heating requirements and fluctuating demand.

Developers and contractors responsible for any project, be it a new build or renovation work, must select the right heating solution to deliver both excellent performance and greater efficiency for the end user, while keeping installation costs within budget. Further to this, contractors need to be able to quickly construct these developments to increasingly high specifications in order to satisfy the rapidly growing demand for new buildings across all sectors.

Underfloor heating is one such option that is revered in high-specification developments. However, it is also a solution that can, for many properties, represent a much more efficient and affordable means of heating than initially imagined, with the added benefit of not having radiators intruding into living or working space.

Yet good heating system performance is just the beginning. As demand changes within a building, structure and layout evolves, and the heating and energy industry adapts to new sustainability targets, the system also needs to be flexible and adaptable in order to keep up with these ever-evolving pressures.

Along with these advances in heating comes the need to develop and implement innovative smart controls – connected devices that regulate, optimise and simplify a variety of building functions, including space heating.

This guide aims to provide the essential guidelines to the changing landscape of underfloor heating, and its status as a solution for domestic and commercial developments. On top of this, it will provide key information about smart controls and their role in improving efficiency and lowering costs. Our aim is simple – we want to debunk myths surrounding the supposed complexity of smart controls, and answer questions around both the specification of underfloor heating, and its use in a multitude of applications.

Thank you for reading.

Franz Huelle
Head of Technical at REHAU Building Solutions

TRENDS: What, why, how, when?

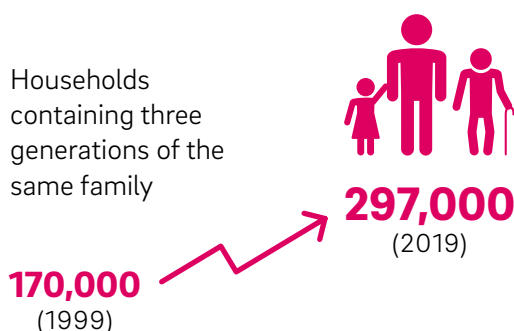
Moving toward multigenerational living

How we live and who we live with is constantly changing, and it is not uncommon to see multiple generations of one family living together under one roof. This trend is borne out in statistics, with estimates from the Office for National Statistics (ONS) suggesting an ongoing increase in households containing three generations of the same family, from 170,000 in 1999 to 297,000 in 2019, marking it out as the fastest-growing household type over the past two decades.¹



Rising rents and an increasingly closed-off housing market are keeping young adults who would've otherwise flown their parents' nest at home. In fact, according to statistics from the Resolution Foundation, around 20 per cent of adults between 25 and 34 live with their parents – a marked increase when compared to 16 per cent in 1991.²

Coupled with these parents welcoming their own mothers and fathers into the family home for childcare and caregiving reasons, it is only natural that heating demands may vary from room to room. After all, pensioners and young couples may have very different idea of what constitutes an ideal room temperature, so the need for heating control solutions that can simultaneously meet these diverging criteria are required.



1. Families and households in the UK: 2019, Office for National Statistics - <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2019#multi-family-households-are-the-fastest-growing-household-type-in-the-uk-but-currently-represent-the-smallest-share-of-households>
 2. All under one roof: the rise and rise of multigenerational life, The Guardian - <https://www.theguardian.com/society/2019/mar/10/rise-of-multigenerational-family-living>

Home and flexible working

The need for adaptable home heating becomes even more pressing when we consider the rise of home and flexible working. Thanks to advancing remote working technology and the outmoding of attitudes about conventional office working patterns, employees are increasingly opting for flexible, home-based working, adapting their working schedules to suit other commitments, like childcare.

In fact, there are now 374,000 more employees working from home than 10 years ago – a 27 per cent increase, according to a 2019 report from the Trade Union Congress.³ With many in the UK workforce now only requiring a laptop, phone and internet connection to be functional, and following the upheaval to working life caused by the COVID-19 pandemic, it is clear this trend is only likely to continue. Taking this into account, householders may find themselves needing to set up a heating schedule for their home working area, separate from the rest of the home's heating demand.



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Using co-working spaces

Commercial premises are also not exempt to the effects of a more fluid working environment. Once synonymous with start-up businesses, co-working spaces have grown in popularity among established companies, especially with office rental prices continuing to be at a premium. These rising prices, coupled with a slow construction rates for new commercial building stock, have resulted in an explosion of in this type of working set-up.

This growing popularity is reflected in industry thinking – for example, when real estate experts Knight Frank surveyed senior executives as part of their 2018 trend report (Y)OUR SPACE, over 80 per cent expected to use more collaborative space over the following three years.⁴ This trend is likely to continue in the aftermath of the 2020 pandemic, as businesses consider moving from letting permanent office space to this more flexible, affordable approach. Given the transient nature of the co-working environment, it is therefore clear that building owners need adaptable heating solutions and controls if they are to meet the needs of the multiple organisations hosted in these ever-evolving spaces.



3. Homeworking up more than a quarter in last decade, TUC analysis shows, Trade Union Congress - <https://www.tuc.org.uk/news/homeworking-more-quarter-last-decade-tuc-analysis-shows>

4. Not Just for Startups: The Rise of Coworking Corporates, Knight Frank - <https://www.knightfrank.co.uk/office-space/insights/culture-and-space/not-just-for-startups-the-rise-of-coworking-corporates>

Mixed-use buildings – a solution in crowded cities

Another factor that needs to be taken into account when looking at smart heating control is mixed-use buildings. For busy city centres, these developments offer a potential solution to an ongoing housing shortage, combining residential and commercial uses in one building to make better use of increasingly limited space.

London requires at least

55

MILLION

square feet of
residential space each year

For example, according to a 2016 report from Savills Estate Agents, London's economic success means it requires at least 55 million square feet of residential space each year to satisfy demand – the equivalent of a 1.9 per cent rise in existing stock per annum.⁵ This equates to 64,000 new homes a year, and this figure is constantly growing. Yet due to a shortfall of 27,500 in housing stock delivery to this target, mixed-use properties represent an attractive solution, and are increasing in popularity among developers both in the capital and in other cities.

However, this solution also comes with its own challenges from a heating perspective. Residential areas within the building may require a different heating schedule to commercial spaces such as restaurants and offices. With that in mind, adaptable solutions and controls are needed.



5. Spotlight London Mixed Use Development, Savills - <https://pdf.euro.savills.co.uk/uk/residential---other/spotlight-london-mixed-use-development-2016.pdf>



The rise of home letting

Home letting has always been popular, with the Office for National Statistics noting that the number of households in the private sector rose from 2.8 million in 2007 to 4.5 million in 2017.⁶ This huge growth of 1.7 million homes represents a 63 per cent rise over a decade, and has been further supplemented by the explosive growth of online rental marketplaces such as Airbnb.

However, those paying for such a service expect a certain level of comfort. Indeed, Airbnb's own consumer surveys highlighted that an overwhelming 97 per cent of US travellers felt their letting's amenities directly impacted their travel experience, and was their second highest priority after vacation quality.⁷

This can result in a balancing act for home letters who rent out space in their own homes, as they can find themselves split between deciding a correct temperature based on their own preferences, and those of their tenant. For hosts letting out more than one room or whole properties, this dilemma becomes even more acute, and may only be resolved through modular smart control technology.

97%

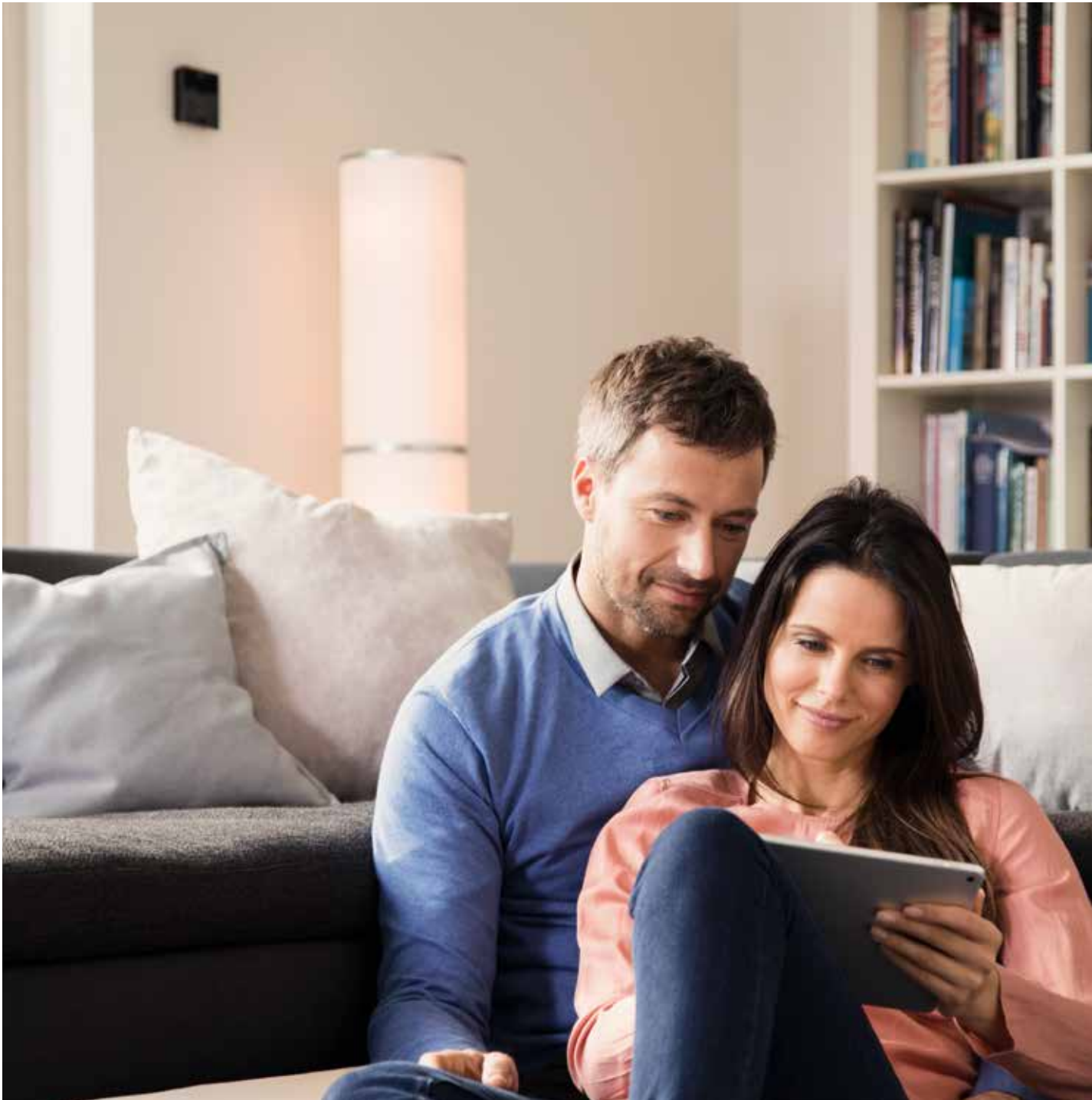
of US travellers felt their letting's amenities directly impacted their travel experience.

6. UK private rented sector: 2018, Office for National Statistics - <https://www.ons.gov.uk/economy/inflationandpriceindices/articles/ukprivaterentedsector/2018>

7. Amenities Do Matter: Airbnb Reveals Which Amenities Travelers Values Most, Airbnb - <https://news.airbnb.com/amenities-do-matter-airbnb-reveals-which-amenities-guests-search-for-most/>

Smart technology growth

The past few years have seen a huge spike in consumer interest around smart home technology, to the extent that research from leading privacy and internet security advocate PreciseSecurity.com estimates the market could be worth approximately \$158 billion in four years time.⁸ As a point of comparison, this same market was worth \$43.4 billion in 2017, and is expected to reach a value of \$91 billion by the end of the year.



8. Global smart home market to reach 158bn by 2024, UK Tech News - <https://www.uktech.news/news/global-smart-home-market-to-hit-%24158-billion-value-by-2024-20200203>

Coupled with the imminent and ongoing implementation of 5G systems into our national infrastructure, this growth shows that one thing is certain – the UK's own smart home market, which was worth over £900 million in 2017, is set for massive expansion.⁹ But what does this mean for smart solutions manufacturers in the heating sector? The answer is simple – consumers will expect to see this increasingly innovative technology adopted in ways that will save energy, while providing greater convenience, comfort, and wellness.



The UK's smart home market was worth over

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Occupant demands

These expectations were documented in a 2017 report by the European Commission's Digital Transformation Monitor into the technologies around the 'Smart Home'.¹⁰ It highlighted how consumers now expect enhanced levels of control over heating, ventilation and air conditioning that will help them reduce energy consumption, and, as a result, their electricity bills. Indeed, according to home automation experts smarthome.com, an atypical householder could cut their energy bills by around a third through the use of energy-efficient smart control systems.

The report also pinpointed another clear benefit of smart technology – that beyond improving a building's energy efficiency levels and helping property owners realise financial savings, such solutions also improve the everyday lives of the building's occupants. As such, it is of paramount importance that any smart heating control system can quickly, easily and intuitively affect temperature, in order to best provide thermal comfort. Furthermore, any prospective technology in this field needs to take account of today's increasingly fast-paced world, where rooms, spaces and entire areas within commercial properties can be quickly repurposed for different employees, and, at times, whole companies. Consequently, a level of modularity is not a bonus for the heating control systems of the future – it is an expectation.

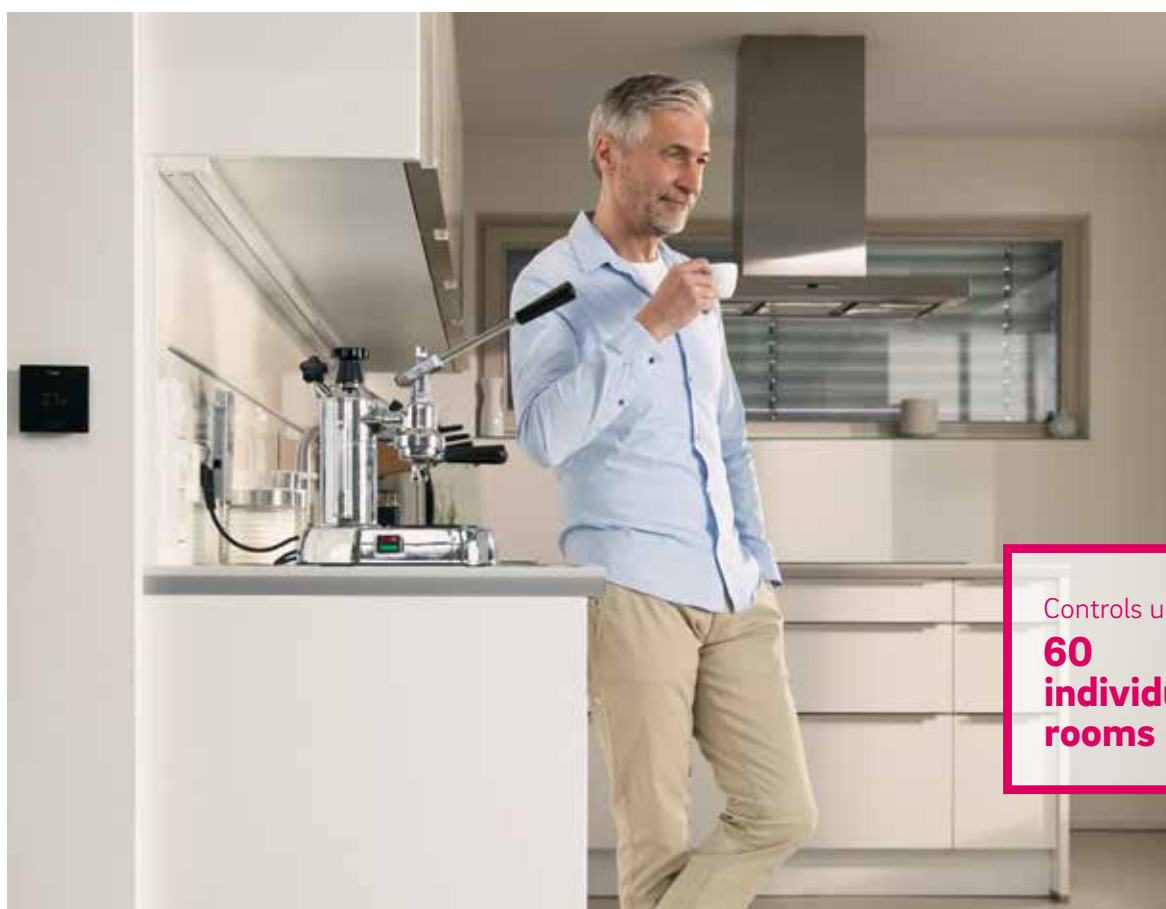
9. Research: UK fastest-growing 'smart home' market in Europe, HiddenWires - <https://www.hiddenwires.co.uk/news/article/research-uk-fastest-growing-smart-home-market-in-europe>

10. Smart Home: Technologies with a standard battle, European Commission Digital Transformation Monitor - https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/DTM_Smart%20Home%20-%20Standard%20battle%20v1.pdf

Flexibility made simple: an intro to

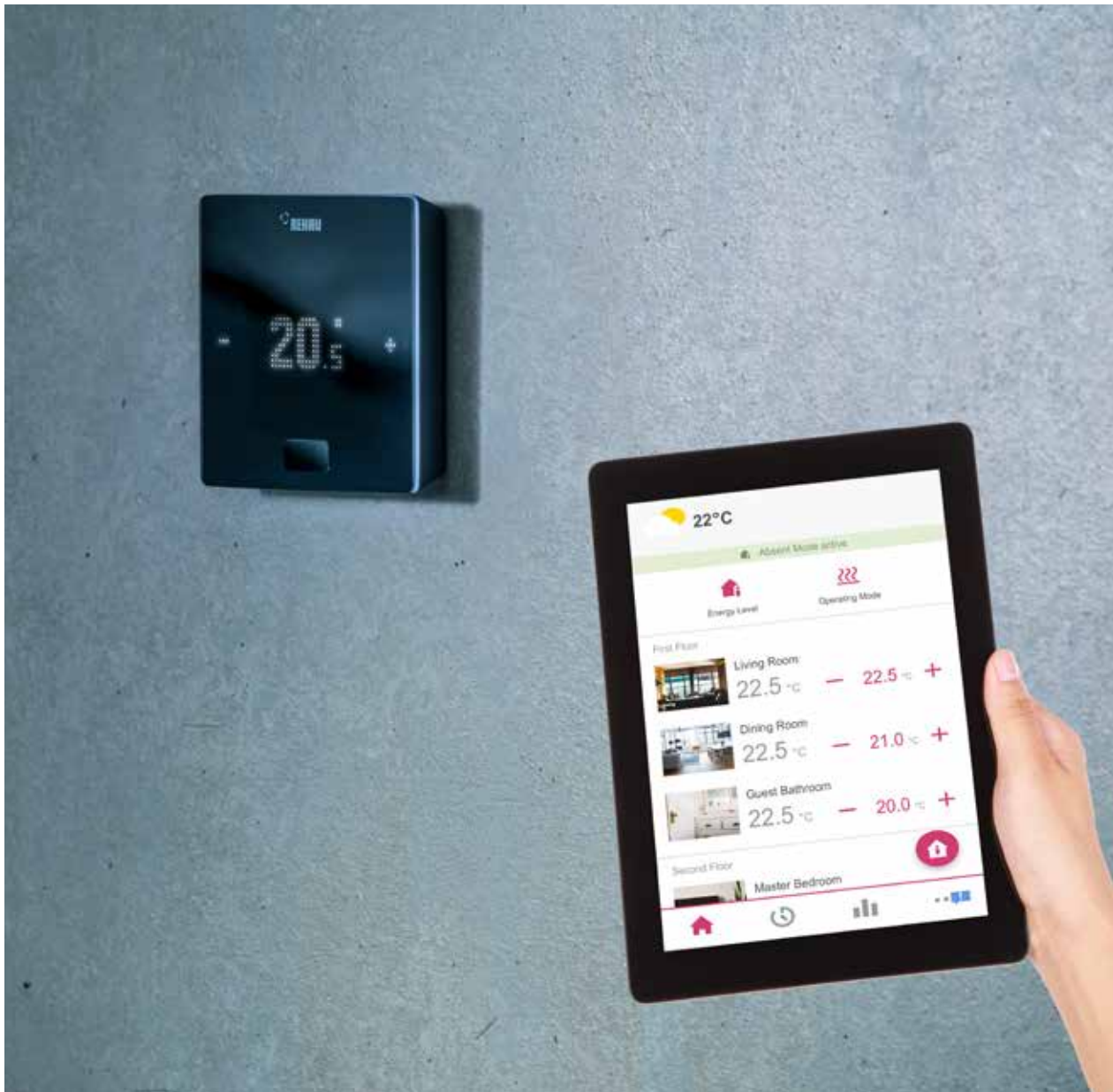
NEA SMART 2.0





With demand for smart controls continually increasing, the **NEA SMART 2.0** brings together elegant design and total flexibility to underfloor heating systems. It can be quickly and simply installed and programmed in any application, and its modular design means it can provide underfloor heating control through a smart device or individual thermostats in anything from one to 60 rooms. From a high-end luxury home, to a doctor's surgery or office block, the system can therefore be adapted to suit the needs of any space, making it an ideal solution for increasingly popular mixed-use developments.

Working from a base station connected to the internet, the **NEA SMART 2.0** controls underfloor heating zones through up to 60 individual room thermostats, allowing a level of room-by-room control suitable to multigenerational households and Airbnb lettings. These can be divided into up to five subgroups that can be programmed individually to fit the building's needs. For example, it can be used dividing an office building with multiple floors or north and south parts of a larger building. Room thermostats can be either hard-wired into the building's fabric or connected wirelessly to the base station, giving complete flexibility at point-of-installation and, crucially, later on in the building's life as the layout and function of different spaces changes.



Get connected

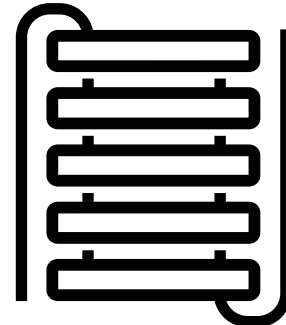
Using data from its own sensors, weather data from its internet connection and information learnt over time from the building's efficiency and occupant habits, the **NEA SMART 2.0** can continually adapt the way it heats individual zones within the building to maintain optimal performance and overall system efficiency. This includes monitoring key variables such as humidity, and detecting events that might lead to temperature drops – such as opening a window – and adapting heat provision accordingly.

This ensures the system isn't expending unnecessary energy to run at full capacity when the weather is warm enough not to need it, or at times when building heating is not required – for example, in an office block after the working day has finished, or to suit flexible working shifts from home or the workplace. Because of this, the **NEA SMART 2.0** can offer energy savings of up to 20 per cent, with over-the-air updates ensuring the latest features are available to maintain system efficiency.

Thanks to its internet connection through the base station, the system can benefit from smart functions such as geofencing technology to location of occupants and heat the premises accordingly. Further smart control innovations such as 'smart start' also mean the **NEA SMART 2.0** will learn over a few days when to start the building's heating, ensuring optimum temperature at times set by the user. Crucially, and unlike conventional smart systems, this occurs on a room-by-room basis rather than solely via the base station or main controller, with detailed temperature analysis of individual rooms serving to constantly improve control behaviour.



The system's connectivity also allows for remote control and maintenance through smart devices, suiting both commercial building facilities managers, and those letting their homes to tenants. End users can operate the **NEA SMART 2.0** through Alexa voice control, and receive information on improving energy efficiency through its app.



Ease-of-Installation

The **NEA SMART 2.0** has been designed with ease-of-installation in mind, offering contractors a flexible solution for a wide variety of applications. Its adaptability makes it suitable for mixed installations with wired and wireless installations, and for expanding on already-fitted systems. Additionally, the system works 'out of the box' for simple tool-free set-ups, with an intuitive commissioning wizard available for more complex systems to guide installers during the process and carry out checks throughout.

Such smart functionality also allows for remote servicing through the internet, with contractors able to access installed systems for servicing, and, with end user permission, access system data through the **NEA SMART 2.0**'s dedicated app. This single point of access enables more intuitive maintenance to be carried out, saving installers time while increasing customer satisfaction. Automatic, over-the-air updates also mean these systems can adjust themselves without installer input as new smart control innovations are developed, further streamlining the servicing process.

The future of temperature control

Always adaptable, endlessly flexible and completely simple, the **NEA SMART 2.0** is an underfloor heating system built for the future. As the rooms and spaces continue to adapt – which is often the case for co-working spaces – so too does the **NEA SMART 2.0**, with the option to add or remove wireless room thermostats as zones are added or merged with the ebb and flow of workers and companies.

It doesn't end with underfloor heating either, with REHAU constantly looking to improve the regulation of building temperature requirements for best possible performance and cost efficiency. With that in mind, new innovations around cooling functionality and integration with other temperature control and building management systems are soon to launch.







Conclusion: Enhancing lives through smart heating

As uptake of smart control solutions continues to grow, it is vital that contractors for commercial and residential properties consider heating control systems that offer the best possible levels of flexibility, modularity and efficiency.

By treating these expectations as standard, rather than extra additions, contractors, developers, and property owners can find themselves better equipped to meet growing trends in both the commercial and residential sphere, including mixed-use buildings, multigenerational living, and increasingly fluid work schedules and locations.



For more information,
please visit

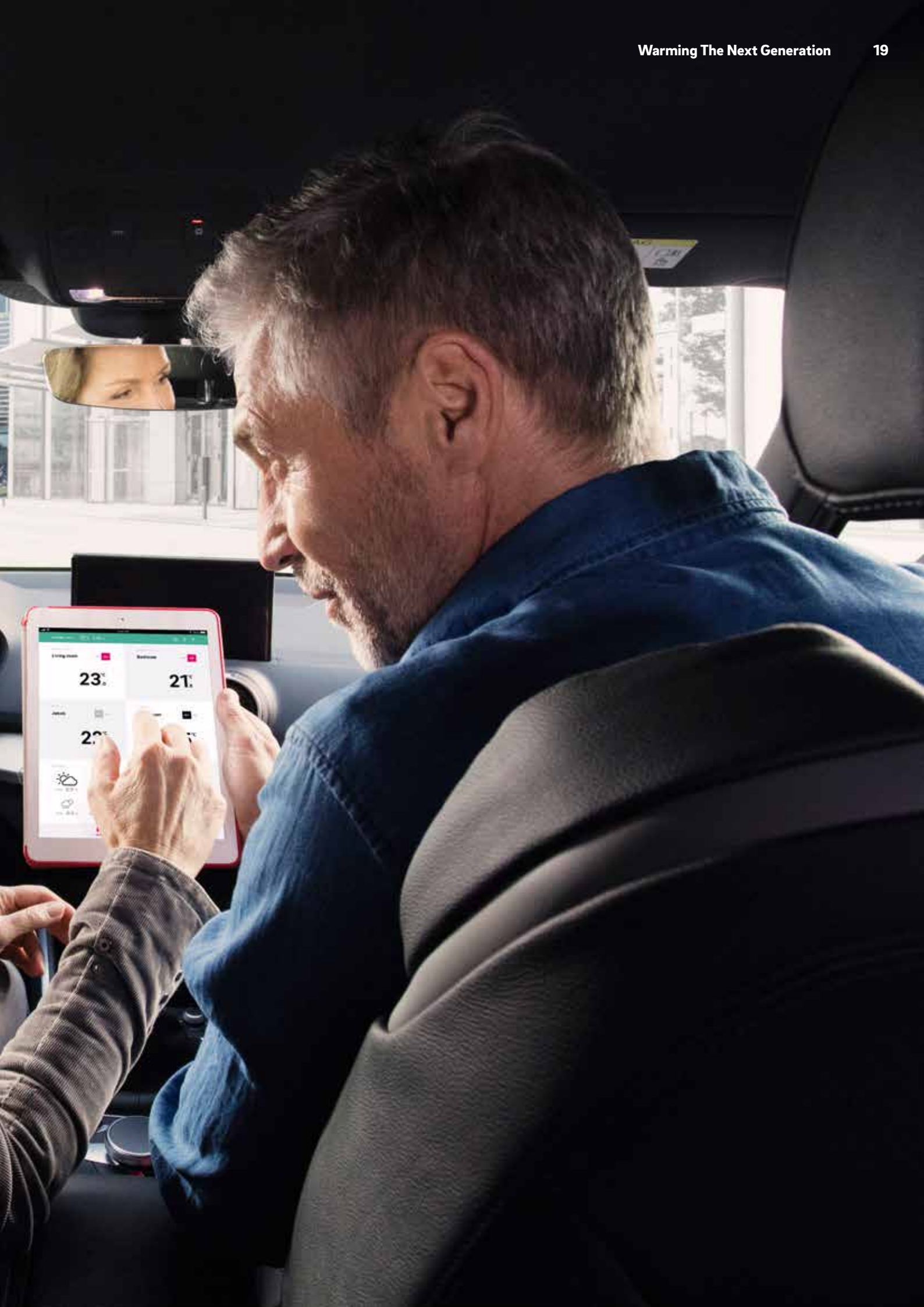
www.rehau.uk/neasmart

Only following this can all parties have full confidence in their heating system to enhance the lives of building occupants, while also providing the highest possible levels of energy efficiency and flexibility to meet the demands raised by changing tenants, internal structures and room purposes.



THE NEA SMART 2.0 is such a system – adaptable to residential and commercial premises of varying sizes, it provides a high level of modular control while improving overall energy efficiency across the building. This flexibility makes it the perfect smart control system for the future, able to grow and adapt to the constantly evolving smart control landscape, and to suit ever-changing end user demands and desires.







For more information,
please visit
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