Special report

Carbon cutting

Carbon-cutting message is crucial for all sectors

The need to cut carbon emissions means extra costs to some but will result in missed opportunities for those that fail to see the advantages

The building services sector has a wealth of options from which to choose when addressing the need to reduce carbon emissions. While upgrading existing equipment with more recent alternatives can produce significant savings in both energy consumption and emissions, there are many other possibilities to consider when renewable energy alternatives are included in the mix.

The government's carbon emission reduction targets are well publicised, as are the potential ways to reduce energy use, as a growing number of installers add to their skills with qualifications for the installation of renewable energy alternatives.

It is interesting to note that the renewable energy technologies proving most popular are those which have received support through government-funded initiatives, such as the Feed-in Tariff and Renewable Heat Incentive schemes.

Before FiT was introduced, for example, PV installations only accounted for approximately 10 per cent of the solar market, with solar thermal accounting for the lion's share.

It is now widely claimed that the situation has reversed, purely because investors have seen the potential to gain returns on their investment far in excess of anything available from banks and building societies.

And while the Renewable Heat Incentive, introduced for the commercial sector at the end of last year, initially proved a slow starter, it has resulted in a boost for installations of biomass technology in particular.

There is now concern being expressed in some quarters of the industry about the lack of qualified engineers to install, commission and maintain biomass boilers, but would this be the case if incentives were not available?

Housing boon

Among the various issues surrounding the drive to cut carbon emissions, Panasonic UK country manager Marc Diaz points to the particular benefits on offer in the social housing sector.

"The government has the steep target of cutting the UK's home carbon emissions by a dramatic 80 per cent by 2050," he acknowledges.

"Ambitious as this may be, battling towards greener living has created the opportunity for new advances in technologies and this is proving particularly beneficial for social housing associations.

"With fuel poverty representing another increasingly important consideration for housing associations and their tenants, developers are investing in the provision of eco-conscious and cost-reducing solutions.

"Efficient heating has also played a key role in helping public sector developers comply with the government's Decent Homes Standard and will continue to do so in the future.

"The challenge for specifiers is which solutions offer the greatest opportunities to meet Decent Homes requirements and solve fuel poverty problems at the same time as helping to meet the UK government's 2050 target."

> "It is paramount that businesses ensure they are equipped to make changes that will ultimately prove to be extremely valuable"
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> **Des Franklin, Mitsubishi**

Mutual benefit

Mitsubishi Heavy Industries European sales manager Des Franklin says businesses can benefit, alongside the environment, from making a commitment to carbon-reducing technology.

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This is a subject that remains high on the government's agenda and cannot be ignored.

The introduction of the Climate Change Levy (CCL) and the announcement of the Carbon Reduction Commitment (CRC) has increased pressure on businesses to take not only responsibility but also action when it comes to sustainability.

"Lowering carbon emissions and running costs, combined with the Climate Change Levy contribution and overall carbon reduction commitment, are all becoming increasingly important," says Mr Franklin.

"Making investments in efficient equipment with low running costs is a great way to save money in the long term, as the price of fuel will continue to rise."

"Caring for the environment is a concern that is likely to become ever more significant as time goes on, so to ensure long-term progression, it is paramount that businesses are able to embrace carbon reduction and ensure they are equipped to make changes that will ultimately prove to be extremely valuable to them.

"Reducing your carbon footprint can appear costly at first, as there will always be an initial outlay associated with updating and renewing equipment, but the long-term benefits that you will encounter really do make the investment worthwhile.

"Carbon cutting is just one way in which businesses will be increasingly expected to commit to sustainability.

"Luckily, innovation in technology is leading to fantastic solutions that can be embraced by businesses, generating mutually beneficial outcomes for the business and the environment."

Ventilation option

GDL Air Systems marketing manager Laura Callaghan agrees that companies should consider all the options available to them to reduce carbon emissions.

Harnessing natural wind power and temperature buoyancy to ventilate buildings, for example, significantly reduces energy consumption that would have been used to operate a more traditional mechanical arrangement.

"In order to maintain a comfortable environment, with the correct air temperature and velocity, temperature and CO_2 sensors maintain a controlled ventilation rate, making a significant contribution to energy conservation," she says.

"Certain pollutant environments require mechanically assisted fans, or at the very least a mixed mode system that can eliminate mechanical costs where possible; however, solar-powered natural ventilation systems can reduce energy demand where power-assisted fans are required."

> "Increased simulation accuracy often reveals systems are far more efficient than predicted by standard calculations"
>
> **Richard Green, Daikin UK**

> "Greener living has created the opportunity for advances in technologies and this is proving particularly beneficial for social housing associations"
>
> **Marc Diaz, Panasonic**

Ms Callaghan explains that solar power can be used to assist in the effective operation of a natural ventilation system, particularly during the summer months at times of high occupancy when an increased ventilation rate is required.

A solar photovoltaic cell is often installed on the roof of a penthouse turret itself, powering the fans situated within the turret and allowing 24-hour supply or extract ventilation.

"During the day in the summer months in particular, there is a build-up of solar gain and human heat gain within all building types," she says.

"Natural ventilation penthouse turrets allow a fresh supply of air throughout the night to lower the internal temperature of the building structure for the next morning, which provides a fresh feel for occupants along with 100 per cent security, as there are no open windows.

"This process will incur virtually no energy costs. Night-time purge can be further enhanced via the battery-assisted fans within the solar-powered penthouse turret."

Model system

Daikin UK's Richard Green notes that balancing building services to provide comfort and ease of use while complying with legislation for planning is not an easy task.

Increasingly, dynamic simulation modelling (DSM) is being used to determine the suitability of HVAC systems in buildings in order to quantify compliance with Part L of the Building Regulations, while being able to observe the effects of these systems on the comfort of the occupants.

The results of these simulations drive the energy and environmental design of most buildings, he says.

"As with all software, the results that you get out of DSM are dependant on the quality of

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the information that is put in and we strive to give honest, transparent and proven information about our systems so that accurate assessments can be made."

Mr Green cites the benefits of producing accurate and realistic simulations of solutions to analyse the performance of systems, enabling the true effects of design and performance to be fully understood.

When applied correctly, simulations can show the building as a whole, realistically displaying how these systems will perform, including defining setpoint changes, control strategy and indoor and ambient air temperatures, while taking into account VRV system attributes such as defrost, oil return and pipe length corrections.

"Increased simulation accuracy often reveals that systems are far more efficient in operation than predicted by the standard SEER calculation method," says Mr Green.

"Systems can be tailored to a building's needs while meeting the requirements for Part L and leading to potential cost and carbon savings."

Money matters

Armstrong's Ed Rowe agrees that the options are out there to make the carbon savings needed, but points to finance as the primary barrier for the industry.

"The main obstacle to uptake of carbon-cutting technologies in commercial-scale applications today is financial," he says.

"This is particularly the case with regard to urgent upgrading of existing HVAC systems in public sector buildings.

"Suitable technologies are freely available and proven. There is significant awareness of this among end customers and across the supply chain, as well as a good deal of commitment from those involved to move in this direction.

"But without the customer having the ability to raise capital funding for such projects, they risk never moving beyond feasibility study stage."

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> **Ed Rowe, Armstrong**

Mr Rowe highlights the advantages of accessing financial assistance, allowing facilities to spread the cost of projects over a number of years.

Through alleviating the need for upfront capital investment, it will be possible for more carbon-cutting projects to come to fruition in the future, he says.

While the reduction of carbon emissions is obviously a major benefit to the environment and also politically important for the government as it seeks to hit its various targets, there are also a number of commercial advantages to be gained by building services companies.

To highlight the various opportunities and explain how companies can gain from these, SummitSkills has recently commissioned a new report.

Low Carbon Buildings and Homes: Skills and Opportunities, produced by the Zero Carbon Hub, has been launched to help businesses get to grips with the current and emerging legislation affecting the green agenda.

The document also summarises the policies and initiatives that the government and the devolved administrations of Northern Ireland, Scotland and Wales have put in place to encourage the move to low-carbon buildings.

Although its primary target is building services engineering operatives, the report is intended to be a useful guide for any businesses operating in the wider built environment sector which are planning ahead and looking for development opportunities.

Green economic boom

SummitSkills chief executive Keith Marshall OBE said: "We wanted to produce a guide that brought together everything businesses need to know, which would enable them to spot the opportunities for growth.

"With a recent Department for Business, Innovation and Skills report showing that the green sector is growing much more strongly than the overall UK economy, now is the time for employers to plan ahead to maximise their future success.

"It was encouraging to see so many people at our launch of this report recently, and I was pleased that it generated lively discussion about the way forward for built environment employers."

The guide covers the critical points of changes to the zero-carbon homes definition, Parts L, F and J of the Building Regulations, Feed-in Tariff, Renewable Heat Incentive, the forthcoming Green Deal, the Code for Sustainable Homes, the new National Planning Policy Framework and where these developments leave existing local plans.

It also features a summary of the new skills required to engage in this fast-moving arena and ensure businesses are best placed to profit from the new and exciting opportunities.

An electronic copy is available at no cost until the end of July from summitskills.org.uk/538