ECA
Excellence in Electrotechnical & Engineering Services

Skills4Climate

Industry Survey Report

TESP The Electrotechnical Skills Partnership

BESA BUILDING ENGINEERING SERVICES ASSOCIATION

REA THE ASSOCIATION FOR RENEWABLE ENERGY & CLEAN TECHNOLOGY

Solar Energy UK

Introduction to this sector survey

During summer and autumn 2020, ECA and partner organisations conducted a sector survey to obtain views on how best to achieve a UK 'green recovery', and in particular views on the skills and training required to achieve 'Net Zero Carbon' by 2050.

The survey was hosted by ECA in association with REA (the association for renewable energy and clean technology), Solar Energy UK (formerly the STA), BESA and The Electrotechnical Skills Partnership (TESP). We also appreciate the support of a further 15 bodies from across the sector and wider industry: EnergyUK, ADE, FETA, SELECT, ADBA, GSHPA, HPF, FSA, BCIA, EDA, JTL, ESF, JIB, AESM and MCS.

About the UK Engineering Services sector

The UK Engineering Services sector comprises:

Over 60,000 Firms

Over 350,000 skilled professionals, employees and contractors

Engineering services:

Delivers design, installation, maintenance, upgrade and repair (RMI) activity across UK in:

- commercial, industrial, public sector and other premises;
- infrastructure such as utilities, communications and transport, and
- domestic premises.

Provides clients, suppliers and customers with technology, services and professional expertise in key areas of the economy such as:

- energy supply and resilience, including renewables and storage
- building energy management and efficiency
- heating
- lighting
- fire and security systems
- air quality
- building productivity and ambience
- cooling and refrigeration, and
- data communications and wireless technologies.

Helps to ensure the UK's built assets are:

- safe
- secure
- sustainable, and
- able to deliver whole life performance.

Some survey highlights:

88%
Support a green economic recovery (Q8)

147
Businesses responded, mainly engineering services contractors

71% Support reduced VAT on energy-related activity (Q9)

74%
Say closer working with colleges and schools would help to bring more young people into low carbon engineering services (Q18).

54%
Say UK can learn from other countries (Q10).

25%
Overall would not be able to find competent workers to meet an increase in demand (Q14).

72% Say poor advice from schools/careers advice is the main barrier to new entrants, followed by being 'unaware of career opportunities' (Q17)

Many respondents do not have access to skilled employees in various low carbon activity areas (Q11, Q13)

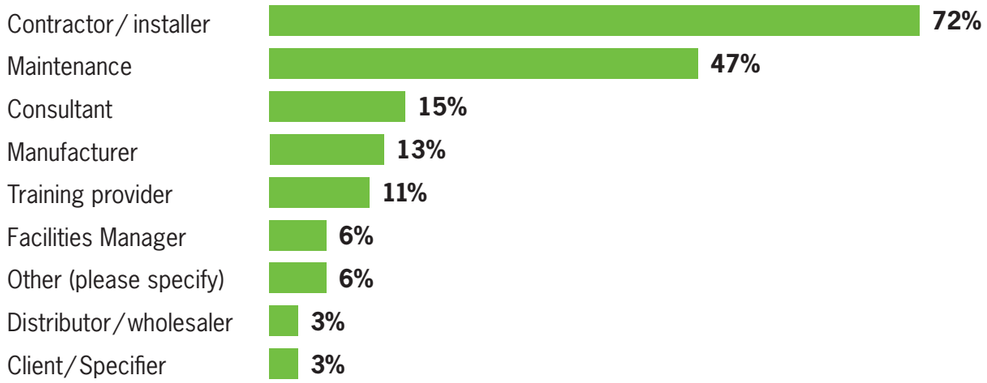
48%
Say there is not sufficient industry training available (Q15)

Requests for support include microgeneration grants, new technology subsidies and greater investment in technical education (Q9) along with government grants to businesses, emphasis on smart technology, and an advertising campaign linked to how engineering services will help to combat climate change (Q18).

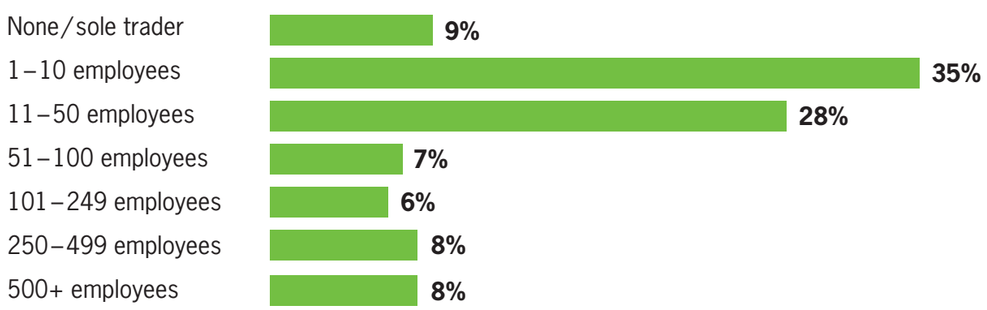
Survey Respondents

The sector survey identified the type of respondent, based on segmentation by size and activity, which provides useful context but also helps with further analysis of the responses.

Q3 What type of activity does your organisation undertake?



Q6 How many employees does your organisation have?



Q7 Which areas of work does your organisation actively undertake (either now or in the near future)?

	Installation/ maintenance	Design	Not applicable
Electrical	73%	15%	12%
Data cabling	70%	5%	25%
Electric vehicle charge points (commercial)	64%	11%	25%
Electric vehicle charge points (domestic)	62%	9%	29%
Mechanical	57%	14%	29%
Building controls/BACS	49%	14%	37%
Solar PV	45%	15%	41%
Smart buildings	44%	20%	36%
Electrical energy storage systems	40%	13%	47%
Energy efficiency/monitoring solutions	40%	19%	41%
Heat pumps (air source)	34%	14%	53%
Heat pumps (ground source)	22%	13%	65%
Smart meters	22%	7%	71%
CHP	17%	10%	73%
Waste/biomass power generation	10%	5%	84%
Wind turbines (onshore)	9%	4%	87%
Heat networks	9%	12%	79%
Hydro-electric power	6%	0%	94%
Anaerobic digestion	5%	2%	93%
Nuclear	4%	0%	96%
Demand side response	4%	18%	78%
Wind turbines (offshore)	0%	2%	98%

Green Economic Recovery

Q8 Does your organisation generally support the call for a 'green UK economic recovery' to the current pandemic?

Industry responses to this question included…

A green recovery could provide quality, well paid, jobs - if it is done well.

If investment can focus on installing for efficiency rather than cheapest cost, this will make a difference.

Commentary

Survey respondents were from a mix of different sized companies, ranging from nationwide businesses employing over 500 people, to SMEs, micros and sole traders. Almost three-quarters of respondents were installation and maintenance companies with 50 employees or less – reflecting the predominantly small business profile of the engineering services sector.

Respondents showed overall support for pursuing a 'green UK economic recovery'. In their detailed comments, many endorsed the aspiration to use post-Covid recovery as an additional opportunity to help meet the UK's Net Zero Carbon policy, although pointing out that this will require focus on outcomes and massive national and local investment.

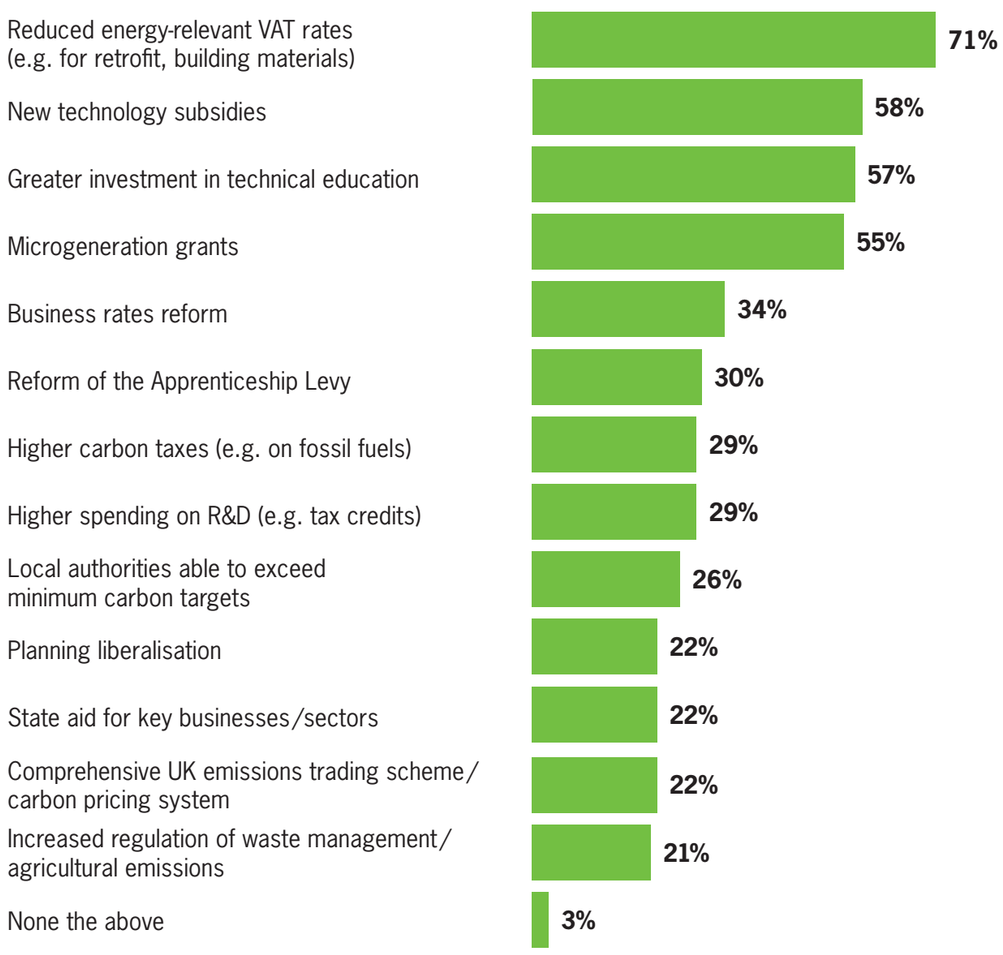
Reducing energy demand through a focus on energy efficiency, in addition to headline items such as energy generation and storage was highlighted in the comments. In addition to the decarbonising of the UK energy network, it is vital that we also minimise demand-side energy requirements and a holistic approach should be taken.

Installation companies can not only deliver the necessary technologies and systems, but also aid the end-user on this journey, by providing trusted information on energy improvement measures and carbon savings.

A sustained green recovery could provide quality, well paid jobs if implemented effectively, but experience shows this is not a given. There has been considerable amount of rhetoric around the notion of a 'green recovery' but it must be implemented correctly- with comprehensive communication between, and connected strategy arising from, all the actors involved – including Government and industry.

Measures to Achieve Green Recovery

Q9 Which of the following can the Government undertake to help deliver a ‘green’ recovery?



Industry responses to this question included…

We need stamp duty reductions for low carbon homes.

High efficiency equipment is often overlooked as it exceeds the energy efficiency defined in Part L. Lower cost alternatives that achieve the required energy performance are often selected, but this short term view can substantially limit the (carbon) saving over the lifetime of a building

All the technology we need exists - innovation needs to be applied to the financing of change, not to the technology. More and better education of the existing installer trade is also needed.

We are fast falling behind other countries in the investment in specific technical apprenticeships. Short courses are not enough, and they specifically target pre-trained individuals. Grants should be available to smaller companies

The Apprenticeship Levy doesn’t need reforming, it needs adopting and promoting. I can also tell you the challenge of getting a trailblazer apprenticeship launched. We are nearly there with the BEMS trailblazer and getting training providers to take it on is based on their commercial model and not the UK PLC need.

Training courses must be designed for learning not for certification, so testing must be separated from the training. Training must also be ongoing, as must assessment of the standards. The current training courses are not fit for purpose. There needs to be a rethink of the initial education as well as the ongoing retraining. Mentoring and work assessment must be more prevalent.

More investment is needed on basic skills before a focus on new renewable energy, smart devices, solar and alternate heating alternatives.

Support industry engineering training and remove the tick box education culture.

Commentary

Financial

Reduced energy-relevant VAT rates had high support from survey respondents, at over 70%. The three other answers with support above 50% were:

- Grants towards microgeneration
- Subsidies for new technologies
- Greater investment in technical education

Compelling fiscal incentives (including subsidies or rewards) can be highly effective in maximising early customer uptake in newly applicable technologies, as initially shown through schemes such as the feed-in-tariffs (FiTs). Whilst long-term confidence is a goal for sustainable technologies, for the goal of Net Zero Carbon 2050 to be reached, additional stimulus through grant/subsidy schemes may be required for newly applicable technologies or systems, such as heat pumps.

Other suggestions included the reinstatement of the Urban Community Energy Fund (UCEF) - this provided grants and loans to community groups to support the development of renewable energy projects that would bring significant benefits to the local community.

Stamp duty reductions for low carbon homes would incentivise some current homeowners to install measures to save money and carbon, noting they could make their home relatively more saleable. Increasing the number of 'green mortgages' would allow people to add the finance for low carbon technologies to much more sizable borrowing, through low interest rate mortgages. An 'energy as a service' model could be utilised, whereby end users subscribe to an energy provider whose job is to reduce the energy consumption of building through various measures. This approach then reduces the amount of energy units (kWh) provided to the end-user, with the result being that similar levels of comfort are afforded to the end-user at or below the original cost.

Reduced energy-relevant VAT rates had high support at over

70%

Education and training

Both in their survey responses and the detailed comments, respondents indicated dissatisfaction with the current technical education and training regime for low carbon skills.

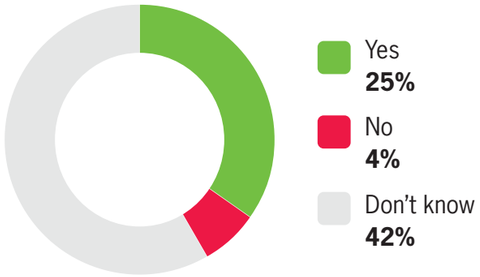
Concerns about a lack of low carbon content in current industry apprenticeships are to a large degree justified, and partly reflect lower levels of collaboration and coordination between industry manufacturers and contractors in the UK than elsewhere – for example, in Germany. Respondents may not have been aware, however, of a Domestic Electrician apprenticeship proposal, currently making its way through the approval process in England, which seeks to put key low carbon technology installation skills at the heart of the curriculum. As the 'energy prosumer' model increasingly becomes a reality (e.g. likely to be included in the next iteration of the Wiring Regulations (BS 7671)), early acquisition of low carbon knowledge, skills and experience is likely to become more important than ever.

One respondent's reflections on their involvement in the specialist Building Energy Management Systems (BEMS) apprenticeship highlights an important potential obstacle in the way of more new technology content – namely, the capacity and willingness of colleges and other apprenticeship training providers to invest in the staff and equipment necessary to deliver relevant knowledge, skills and experience. Similar concerns could undermine the successful roll-out of the proposed Domestic Electrician apprenticeship and any upgrading of new technology content in more established apprenticeships, unless contractors, manufacturers, training providers and apprenticeship funding agencies can pull together more effectively to overcome them.

Some respondents were however critical of the content and quality of training associated with low carbon technology certification schemes – dismissed variously as 'not fit for purpose' or 'tick box'. Scheme provisions on individual installer competence tend to be fairly sketchy, with a myriad of different 'approved' commercial courses on offer, some involving controlled assessments and/or regulated qualifications, but others not. Some of the comments also reflected wider concerns within the engineering services sector that these and similar certification schemes tend to disregard broader underlying installer competences (which generally take several years of learning and experience to acquire) and to focus exclusively on short training courses related to one technology (typically lasting one or two days).

Possible Lessons from Abroad

Q10 Can the UK learn lessons from other countries in terms of moving towards net zero carbon?



“ Industry responses to this question included…

This is a worldwide issue and the best solutions and ideas should be shared and developed”.

Many roadmaps to net zero carbon Britain have been bandied about for years, we just need a stable, resourced policy landscape to allow us to do it.

Germany is a good example of how progressive training works. They also take a higher level of intake into the trades, instead of picking from students who didn't go to university.

Germany, France, Sweden, South Korea all seem way ahead with the investment in new technologies and the incentive regimes for decarbonising using tax benefits, amongst others, to change consumer behaviour.

Across the EU and in other parts of the world there are schemes in place to move more quickly to a carbon zero future - Scandinavia for example is moving far quicker than the UK.

UK building standards fall very short of other countries and there is (insufficient performance testing on new build or retrofit projects. Poor systems design is our Achilles heel.

Commentary

European, and notably Scandinavian, countries are clearly viewed as being more progressive towards low-carbon technologies than the UK.

It is however important to note that historically some of these countries deployed district heating (e.g. Denmark, Austria, Norway) and as such their (less numerous) building stock has been built around these. Moving to these systems presents major difficulties for current UK infrastructure but could be better suited for new build developments.

The reference to the German training system above highlights a huge gap in attainment between the UK – where, for example, employers currently around 6,000 electrical apprentices each year – and Germany, where the equivalent number is 40,000. Industry training in Germany is underpinned by enterprise and individual licence to practice regimes, similar to mandatory occupational licensing under the NABERS programme in Australia, which is reported to be similarly successful.

It is probably time, therefore, for the UK to reconsider the causative links between these forms of licensing, enhanced status for trade occupations, industry commitment to training, and higher take-up and performance of low carbon technologies.

Low Carbon Skills Shortages

Q11 Does your organisation already have enough access to skilled employees in the following areas?

Response from those who considered the technology applicable to their activity (most applicable in bold)	Yes – always	Yes – generally	No	Don't know	Not applicable
Electrical	29%	50%	21%	--	5%
Mechanical	10%	59%	31%	-	29%
Building controls/BACS	6%	51%	42%	2%	34%
Solar PV	14%	36%	49%	1%	26%
Heat pumps (ground source)	5%	28%	59%	3%	49%
Heat pumps (air source)	7%	38%	56%	-	44%
Smart buildings	8%	35%	53%	4%	34%
Electric vehicle charge points (domestic)	23%	51%	26%	-	28%
Electric vehicle charge points (commercial)	21%	52%	24%	3%	21%
Electrical energy storage systems	2%	39%	49%	10%	33%
Data cabling	21%	65%	15%	-	25%
Smart meters	8%	46%	43%	3%	49%
Energy efficiency/monitoring solutions	7%	44%	44%	5%	43%
CHP	0%	30%	56%	15%	64%
Heat networks	4%	23%	69%	4%	65%
Demand side response	0%	25%	64%	11%	61%
Wind turbines (onshore)	5%	15%	70%	10%	73%
Wind turbines (offshore)	0%	15%	77%	7%	82%
Waste/biomass power generation	0%	27%	62%	12%	65%
Nuclear	0%	19%	81%	-	78%
Hydro-electric power	0%	13%	81%	6%	76%

Rounding may affect total percentages shown within 1%.
Figures at left do not include 'not applicable'.

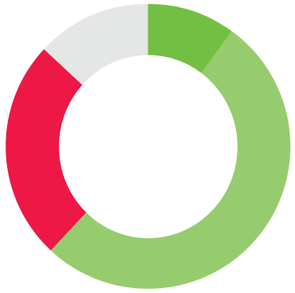
Commentary

Respondents who regarded the following technologies as applicable to their current business activity/plans highlighted significant lack of access to skilled employees. This ranged across all technology types.

This is clearly a problem for those businesses looking to carry out or expand into low carbon activity but also for the future of the UK Government Net Zero Carbon commitment. A potential solution is to create packages of good quality up/reskilling for qualified installers in specific, designated areas (e.g. electrician to heat pump installer).

Interdisciplinary Issues

Q12 **When working on projects crossing multi-disciplines and trades (e.g. housing and commercial projects) is there clear understanding between those involved on how different technologies interact with each other?**



- Yes – always **10%**
- Yes – generally **52%**
- No **25%**
- Don't know **13%**

Industry responses to this question included…

Generally, because systems are new, the other trades have no concept of how the systems work.

There is too much separation between the trades. Most electricians don't understand how the mechanical devices work, and heating installers don't know how the controls work. This is especially obvious when fault finding.

There is a clear lack of understanding to the importance of multi discipline interoperability.

We see instances on high-end residential projects where no centralised controls are implemented, allowing AC and heating systems to operate independently and against each other.

With so many systems out there, the understanding of how one system works can be totally different to the next system installed.

More work to be done integrating smart systems so they work together to make the whole building smart, and not just a building full of smart stuff.

Training is skills-specific, without linking to project outcomes.

Commentary

Although over 50% of respondents thought that there was a 'general understanding' across the trades on how the different technologies interact with each other, less than 10% were positive that there was a 'clear understanding'.

Comments reflect concern that M&E isn't seen as one overall systems solution. Many of the low carbon technologies are still nascent and there is little understanding of whether and when they should be used. In particular, there is a lack of understanding of design and controls for heating (building heating being a fundamental low carbon challenge) – and even heating and air systems competing against each other, with no centralised control system.

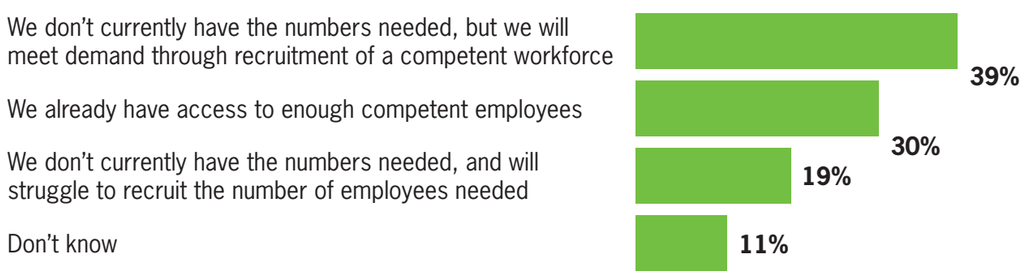
Failure in addressing these issues can easily result in sub-standard installation (with the serious risk of 'sub-optimal low carbon installation - at scale') and a loss of confidence in technologies, systems and policy drivers. Conversely, there is much to gain in addressing these issues.

One approach could be to introduce more cross-skilling training, both at entry/ apprenticeship level and through upskilling of existing skilled mechanical, electrical and plumbing workers. Colleges and training providers would need convincing of the value of investing in the capability to deliver cross-skilling training content, however.

Workforce Skills and Available Training

Building on Question 11, Questions 13, 14 and 15 were posed to give further insight into how respondents view the current skills, future requirements and training options for the low carbon workforce.

Q13 Regarding low to no carbon work, which statement best describes your position?



Industry responses to this question included…

There is a large enough workforce, but they are very under-skilled.

We'd like to train existing plumbers and electricians to provide low carbon solutions, but we need access to funding to help us do that.

We will train and expand our own team if and when demand requires it, but we need to see some evidence of sustained demand first.

We struggle to recruit the number of employees we need with the correct skillset, there seems to be a dramatic loss of skilled workers within the industry.

We take on young engineers and people wanting to change career path and train them. Get UK companies of our size to unleash the potential they have to train people with modern skillsets - and to the values that reflect their businesses - and the recruitment challenge will be won!

There is a need to distinguish between electrical engineers (who undertake a five-year apprenticeship) and those going through three-week courses.

In-house on the job training is more relevant than most training courses which are usually for one discipline only. Today you need to have a mixed skill set.

Q14 Regarding low to no carbon work, if demand was to increase substantially over the next 2 years, which statement best describes your position?

Industry responses to this question included…

We would develop and introduce the appropriate skillset requirements into our training academy.

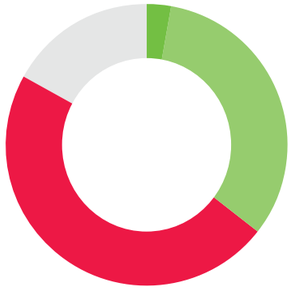
We are currently looking for employees and have struggled over the last two years, in both tradespeople and apprentices.

Skilled and educated labour in engineering disciplines is limited, and it has been for many years.

We are recruiting and training for growth.

In-house resource is limited so sub-contractors would have to be utilised.

Q15 Is there sufficient industry training available for your low to no carbon activity?



- Yes – for all aspects of our work **3%**
- Yes – for most aspects of our work **33%**
- No **48%**
- Don't know **17%**

Industry responses to this question included…

We'd assume that particular manufacturers would be able to assist with training requirements.

Start with a degree in mechanical or electrical engineering then teach the practical side of the work.

It is all relevant to cost and the need for training if the supply of work does not warrant it.

We do the training in house. We've also found any training that is provided to be either lacking or even misleading.

The best training is work experience: most training courses are supplied by the manufacturer, who only offer the training for their products, which leads to multiple courses for the same technology.

Upfront costs and labour turnover generally impact the appetite…to invest in training.

Commentary

Question 13 provides a snapshot of the current position, with just under 20% of respondents indicating that individuals with the right low carbon skills are hard to come by. This proportion increases to almost a third, however, in Question 14, when respondents are asked to contemplate a situation where their low carbon workload grows substantially over the next two years.

Some of the detailed comments on both questions echo others made earlier in the survey, including a lack of current workforce capability in low carbon technologies, insufficient cross-skilling between different disciplines, and apparent tolerance of unqualified installers practising in some low carbon markets after attending just one short course.

Around half of respondents expressed dissatisfaction with current low carbon training. Some respondents suggest they are dealing with this by developing their own in-house training, whilst for others the absence of good quality, cost-effective industry-level provision appears to be a significant obstacle to getting more involved in low carbon technology markets.

Manufacturer training is currently relied on a great deal, although this can lead to multiple courses of the same nature, of variable quality and naturally skewed to a specific commercial agenda. Additionally, manufacturer training is normally about products, rather than wider (non-proprietary) systems or holistic approaches to achieving low carbon outcomes. One positive industry response, therefore, could be for contractors and manufacturers to collaborate in developing broader-based training (and even qualifications), focussed on common or transferable skills and knowledge, applicable across different products and/or technologies.

Specific low carbon training highlighted as being required included:

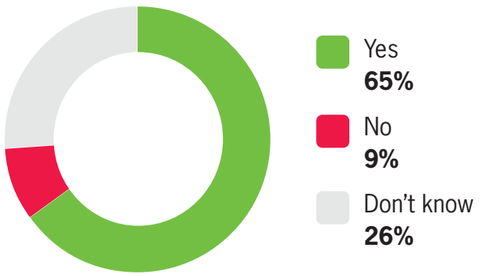
- Community energy advice
- Retrofit co-ordinators
- Advice for vulnerable households
- 'On the job' short courses for plumbers and electricians with existing engineers. Ideally paid for to encourage attendance
- Low carbon systems and efficiency/ emerging solutions
- National training course covering low temperature systems, along with heat pump technologies, which is nationally recognised (similar to Gas Safe)
- Multi-skilled building services for facilities management
- Broader training and certification for competency in commercial EV charging, energy storage and solar PV
- Apprenticeships and graduate pathways in renewable technologies at all levels.

Recruitment – Career-changers

Previous labour market research has highlighted a growing demand for engineering services skills, boosted by the opportunities offered by low carbon and other new technologies. At the same time, employers have continued to highlight obstacles inhibiting the required expansion of industry recruitment to meet this demand, affecting both school-leavers and older candidates, such as career-changers.[1]

The survey therefore asked questions about both groups – starting with career-changers.

Q16 Would you consider employing traditional energy sector workers (e.g. those with most of their background in the fossil fuels industry) in your organisation?



65%

were willing to employ 'traditional' energy workers

Commentary

It is welcome, but perhaps unsurprising, that a significant majority of respondents (65%) said they were willing to employ 'traditional' energy workers. With existing trade skills, as well as broader life and work experience, many of these workers could fit reasonably well and quickly into an expanding engineering services sector. Smoothing their transition into low carbon jobs should also help to set aside concerns that a low carbon future necessarily means job losses.

Unfortunately, experience of previous large-scale programmes to redeploy skilled personnel from one sector to another indicates that there is a risk of traditional energy workers being misdirected onto short training courses. These may well generate quick measurable 'outcomes' for Government agencies and training providers to report but fall short on creating genuinely competent installers with sustainable attractive careers and crucially, installers who can deliver good installation performance outcomes.

Alternative, industry-endorsed routes for career changers already exist, but require a greater investment in time and money than the 'quick-fix' solutions described above. In most jurisdictions within the UK, apprenticeships and apprenticeship funding are now open to people of all ages, and with provisions for individuals' previous learning and experience to be recognised – potentially reducing the time it takes to qualify. Adult learners may struggle to get paid on typical apprentice rates of pay, however, and so Government intervention to subsidise apprentice wages in these circumstances would make a successful transition into a rewarding, long- term career in engineering services a much more achievable prospect.

For those with a greater amount of transferable knowledge and skills, the adult apprenticeship may be unnecessary. In the electrical contracting sector, for example, there is a well-established Experienced Worker Assessment route to qualifying as an electrician. Depending on the individual's previous knowledge, skills and experience, and the extent of any gaps, this usually takes between three and eighteen months to complete, at a cost equivalent to, or below, that typically charged for commercial short courses.

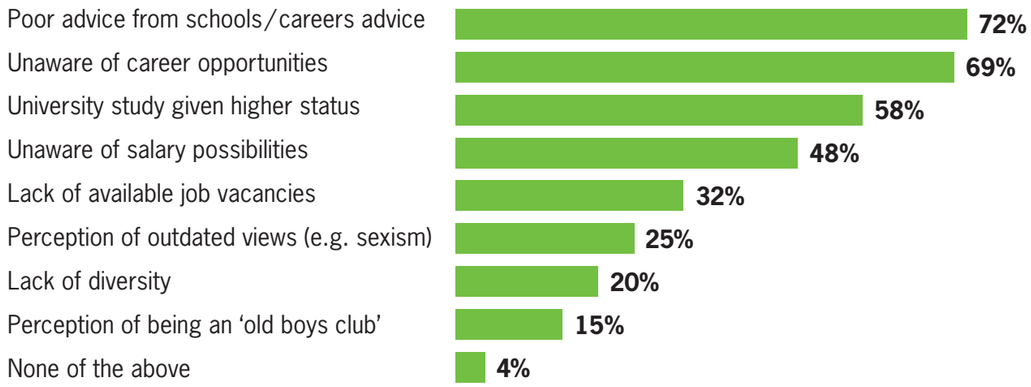
Closer cooperation between Government, engineering services and the traditional energy sector in signposting and supporting career changers along the way could therefore bring about substantial outcomes – which would be genuinely transformational – within a reasonable period and for relatively modest cost.

[1]See, for example, the Electrotechnical Skills Partnership's (TESP) Labour Market Intelligence 2018/19 report, available here: https://www.the-esp.org.uk/our-work/labour-market-intelligence/.

[2]See, for example, TESP Electrical Routes to Competence, available at https://www.the-esp.org.uk/our-work/training-routes/.

Recruitment – Young People

Q17 Which of the following do you believe are barriers to young people joining the industry?



Industry responses to this question included…

Lack of respect for tradespeople and their skills.

Most schools have traditionally promoted the university route as the preferred passage from school to work via university, and apprenticeships have not been given the same level of priority.

Most careers advice still appears to move students into 6th form study then university.

Parents generally want their children to have a degree and a "clean" job. Some do still value a trade.

The apprentices we have had in the last three years have been hard work. No real interest in the job/work, unable to get to work on time, forever using their mobiles. This is a generational problem.

A lot of the younger generation do not want to work their way through, up or into this type of career. They are normally looking for an easy fast track to supervisory management with no knowledge and a lack of experience.

Sole traders cannot afford the time or cost of recruiting, employing and training a new recruit. There is no incentive to take on the extra work involved, let alone the responsibility.

Uncertainty due to current climate and industry needs to drive more training access available to smaller companies.

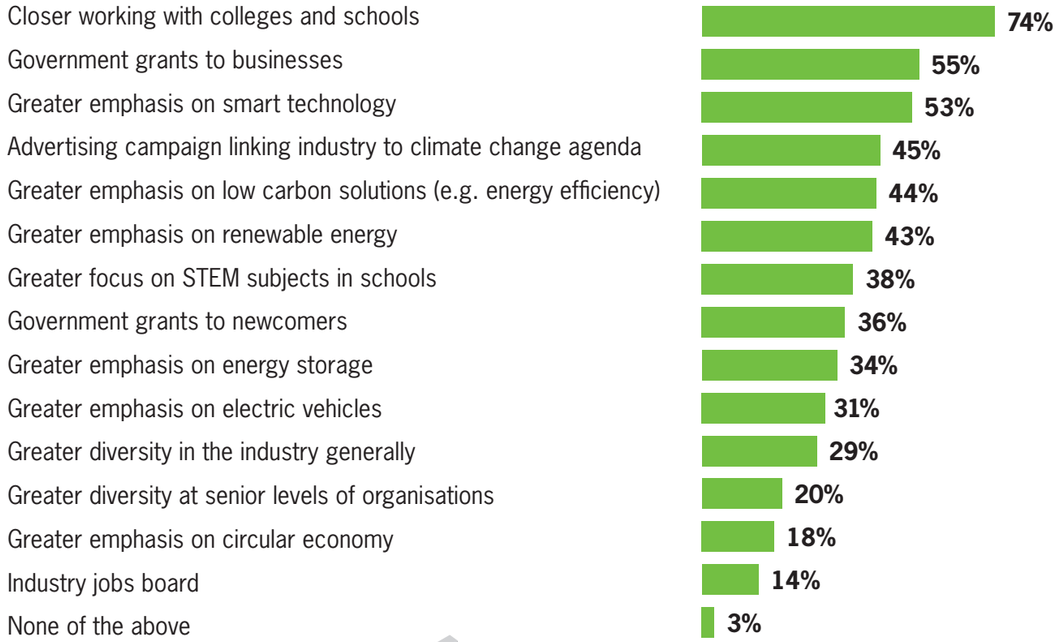
There should be grants to cover wages and training for small companies, paid out of the apprenticeship levy.

There is no barrier to this. Many thousands of young people enrol at college every year on construction and building services courses. These are diploma students, and they outnumber apprentices vastly. They complete their two years at college, and most will not find an employer to take them on to achieve an NVQ. As these diploma students get older, they may still enter the industry (nothing legally prevents them) even if they are extremely under-skilled.

Some 50,000 diploma and NVQ students and only around 6,000 long term job opportunities because companies simply cannot afford to continue a student's training. This is a huge problem.

Sell the excitement! This is the generation that will engineer us towards and over the net zero carbon line in 2050 - it's there for the taking, the chance to make the difference we all seek!

Q18 Q18 Which of the following do you believe would help to bring more young people into the industry?



“ Industry responses to this question included…

We get great reactions when our young engineers visit schools, colleges and universities and talk about the cool stuff they do in smart buildings. That is the easy bit: what these young people need then is the pathway and real support from academics and companies – and real projects to work on.

We need a sustained campaign to attract school leavers and graduates into the sector with a clear statement of opportunities available, and not just to STEM pupils.

One of the biggest obstacles to getting more young entrants into the industry is the recent deterioration our local colleges. We are seeing chaotic standards and management which will in turn be very disillusioning for young people when they are not trained to the correct standard in the correct environment. I can't consider taking on an apprentice this year – I can't find a suitable competent training provider in my area.

Create a 'University of Low Carbon Trades'. Same deal as going to (accelerated) university, but you get a combination of in-class and on the job training in low carbon technology. Done well you could practically promise 100% chance of walking into a job after two years.

Most of the construction and building services industry is no longer made up of employed people but sole traders. Sole traders don't tend to take on apprentices, unless they are family members. Young people are enrolling at college by the thousands. They will do exactly the same theory and practical simulation tasks as apprentices. They do not do on-site training (they are supposed to, but there are just too many of them each year) and they VASTLY outnumber the number of possible employers to take them on.

Better regulation of standards for the overall industry, building on the start that MCS has built up. For example, make MCS certification a requirement for building control sign off. This will ensure that training and learning is rewarded with better pay and job security. Raising standards will also raise the status of the industry.

Bringing back greater accountability which will naturally raise trust and respect in the trade industries. The UK heating industry workforce is seen as low paid, semi-skilled by the public and is generally mistrusted. This is valid because regulations are not enforced, and so quality of work varies massively. Finding a 'good tradesperson' is deemed very difficult, whereas in places like Germany, trades rightfully have public respect.

Commentary

Responses to both questions reflected the wide range of possible explanations of the "problem" of recruitment of young people into the UK engineering services sector, and therefore also what the optimal "solution" might be.

One school of thought focuses on negative perceptions of trade occupations among parents, teachers and wider society. Certainly, there is widespread evidence to support the argument that past Governments have promoted university as the default pathway for school leavers, and that schools and parents have also tended to encourage young people to acquire a degree and move into a "white collar" occupation. Until very recently at least, apprenticeships and Further Education have not attracted the same level of financial or cultural support as Higher Education, even though they can, in practice, provide better paid and more secure employment, with many options for further career progression.

For those who subscribe to this explanation of the "problem", the logical answer is to break down existing barriers between industry and education and challenge inaccurate perceptions about what working in engineering services is like – demonstrated by the exceptionally high proportion of respondents (74%) supporting closer working between industry and colleges/ schools, for example.

A connected line of thinking led some respondents to suggest that that industry is failing to 'sell the excitement' around the low carbon agenda. Framing engineering services as not just a sector that can offer an interesting career with long-term prospects, but also an opportunity for a young person to be part of the solution to climate change would seem an attractive approach. Nearly half (45%) of respondents supported advertising campaigns which link industry to the climate change agenda. Other responses suggested that positive outcomes can be achieved by engineers' visits to schools, colleges and universities – especially when young people are presented with the exciting 'cool stuff' that can be installed in 'smart buildings'.

Some respondents adopted a quite different tack and highlighted what they perceive as serious failings in the present education system, with Further Education colleges in some areas cited as lacking the staff, resources and/or inclination to properly deliver advanced trade apprenticeships. Concerns of this kind support an argument that it is time for industry to take back responsibility and control over training itself – exemplified by one respondent's call for the establishment of a 'University of the Low Carbon Trades'.

A less positive note is struck by responses which emphasise negative work attitudes and behaviours among many young people. There is evidence to suggest that apprentice drop-out rates in England, for example, have increased significantly in recent years, and it is not difficult to see how one bad experience might put some – and particularly smaller - businesses off for good. Given the informal, even haphazard, way in which much apprenticeship recruitment currently takes place, one way out of this cycle could be for firms to adopt a more structured and informed approach to recruitment.[3] Widening the net could also help address the sector's long-running (lack of) diversity issues.

Another, category of responses turns a spotlight onto behaviours inside industry and how structural conditions have evolved to influence those behaviours. The average size of engineering services firms has dropped significantly during the twenty-first century, and small firms, microbusinesses and sole traders are generally much less likely to recruit and train apprentices than the mid-sized firms they have supplanted. Damning figures about the number of full-time students interested in an engineering services career but unable to secure an apprenticeship challenge some of the assumptions above that a lack of interest among young people is the main problem.

Given the growth in small/ microbusinesses and sole traders, some respondents argue that more needs to be done to help such businesses contribute to apprenticeships. A majority of respondents (55%) supported increased Government grants to businesses, for example. Whilst existing levels of apprenticeship funding might appear generous already, (especially in England), these grants generally go towards supporting the cost of training rather than the costs of employment.

For smaller businesses, which generally lack the administrative and staff resources to support the demands of an apprenticeship, it is these latter costs that tend to make recruiting an apprentice too much of a burden. Accordingly, some form of small-firm wage subsidy, alongside better support for employers in their day-to-day dealings with their apprentice, training provider and Government agencies, might represent necessary preconditions for any meaningful increase in apprentice numbers.

For others, increased and/or more effective market regulation is what is required to promote good businesses and relegate the bad. Respondents falling into this camp echo the points already made in relation to Question 10, that stronger certification/ licensing systems (such as are found in many other parts of the world, including Germany) can have positive effects in boosting employers' commitment to training and raising the status, attractiveness and integrity of trade occupations.

The virtues of schemes such as MCS in helping to regulate the industry was mentioned by one respondent. Such schemes, including PAS2030 and PAS2035 and alongside Trustmark registration, are increasingly being required for Government-funded programs such as the Green Homes Grant. Moving forward, these may also become requirements for obtaining green customer insurance and mortgages, where low carbon technologies have been installed

It is therefore important that clearer information on how these schemes interact is available for installers. This will enable more businesses to compete for low carbon activity, without facing unforeseen delays through registration.

[3]See, for example, this attempt to introduce psychometric testing: https://www.ecatoday.co.uk/blog/530/Want-to-find-the-best-fit-for-your-team-Theres-an.

Conclusion

In at least one important regard, the results of this survey are positive - reflecting increased industry recognition of, and engagement with, the future low carbon agenda. However, there are several significant issues and concerns going forward.

The anticipated future increase in demand for low carbon solutions will require significantly higher numbers of skilled installers and designers, potentially creating an industry skills bottleneck.

There is generally a lack of deployable training relating to low-carbon products and systems, and an emphasis and over reliance on manufacturer training. Apprenticeship programs with embedded low-carbon technologies could be effective for newcomers, but major up-skilling and re-skilling programs are required to aid current design and installation practitioners to build and keep their skills up to date. Support is required to help many more companies and individuals access training programs.

Discord is evident between education, training and accessible work placements. Industry and the education sector need a program of joined up thinking, planning and roll-out. STEM education and vocational training hasn't been matched to work placement schemes and creating a workable pathway for those finishing their training or education and entering the workplace needs careful consideration.

Better messaging across the sector is required, to make clear the virtues of becoming a practitioner in this industry, including being part of directly addressing and solving low to no carbon installation challenges.

While generally looking for support, many companies are still unaware of the funding and opportunities that are available, as well as registration requirements with certification schemes in order to undertake funded low carbon works.

There is scope for helping the transition of workers from industries which may see a reduction in current activity, such as the oil and gas sector, as we progress to a decarbonised society.

Increased cross-skilling and an awareness of how technologies interact is important for meeting the numbers of installations required and for ensuring deployment of work in this sector is carried out safely, efficiently, and to a high standard.

As we enter 2021, we are still at the crossroads of major low carbon opportunity - and challenge. A fully co-ordinated national effort is clearly needed to deliver the skills and capacity necessary to enable an engineering services low carbon revolution. Such a coordinated effort must include government, installation contractors, educators and trainers, the product supply chain along with other key actors, and we offer a series of recommendations for action overleaf.

The attainable prize from a national coordinated effort is the low carbon transformation of UK buildings and infrastructure, delivering transformative benefits to the environment, society and the UK economy.

Recommendations

This survey has identified a number of current challenges in delivering the skills to enable a range of 'low to no carbon' technology solutions. These challenges will become more pronounced as the UK looks to significantly ramp up 'low to no carbon' installation in future.

To address these challenges, and realise the opportunities, we have made a number of recommendations below for a coalition of industry organisations to take up in coordination with with Government and other stakeholders. Comments on these recommendations are welcome from all those with an interest in developing a skills base that will effectively support the roll-out of 'low to no carbon' technology solutions.

Improvement objective	Recommendations
1. Improve the quantity and quality of new entrants	• Overcome widespread ignorance/misunderstanding about engineering services careers, and their attractiveness as a career option and path • Repair structural weaknesses in links between the engineering services sector and education • Remove obstacles in way of those currently unable to follow a conventional apprenticeship route.
2. Improve the sector's capacity to absorb new entrants	• Correct long-standing dysfunction within the engineering services labour market • Tackle low take-up of apprenticeships among many employers – e.g. extra incentives and support for micro-employers • Overcome obstacles preventing recruitment of more full-time students, career-changers, etc. • Alter the risk/reward calculus for businesses considering whether or not to employ, train and develop people.

Improvement objective	Recommendations
3. Improve low-carbon content in entry-level qualifications	• Correct inadequate coverage of low-carbon (and other emerging technologies) in standards and frameworks • Address lack of capability among colleges and apprenticeship training providers to deliver more low-carbon (and other new technology) content.
4. Improve the availability and quality of low-carbon upskilling training and CPD	• Rectify the lack of structure and coherence in current upskilling and CPD training • Rectify the lack of quality, rigour and consistency in current upskilling and CPD training • Address other obstacles to higher take up of upskilling and CPD training – e.g. costs, shortage of online options, etc.
5. Improve the effectiveness of low-carbon enterprise certification schemes	• Replace unnecessarily costly, onerous and/ or convoluted scheme requirements (especially those affecting small businesses) • Correct a general lack of understanding/ rigour in individual competence requirements under these schemes • Address any weaknesses in monitoring and enforcement by the schemes.
6. Adopt a more holistic approach to low-carbon skills	• Clarify the inter-connections between the various aspects of 1–5 above • Ensure that training covers a systems, not just an individual product or technology, approach • Learn lessons from other, more joined up systems (encompassing business and employment models, competence, apprenticeships, upskilling, status and career progression) – e.g. including the nations variously cited in this survey.

Notes on this survey

Head office details

Rotherwick House,
3 Thomas More St,
London E1W 1YZ

Tel: 020 7313 4800
Fax: 020 7221 7344

Registered in England: company number 143669

REV: 0822