SKILLS FOR NET ZERO

The electrical industry discuss the growing demand for skilled jobs to deliver Net Zero

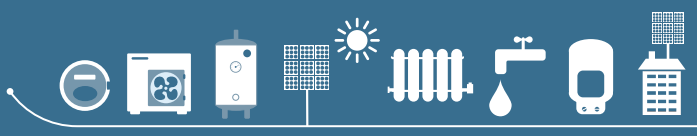
October 2021

BEAMA members represent a key sector in delivering the Government's ambition for

2 MILLION GREEN JOBS BY 2030.

But we are already facing skills shortages in our industry and urgently need to address pathways into the green jobs sector.

Investing in education, training and recruitment resources now will ensure the UK industry can grow at a speed required to meet Net Zero and foster a workforce that will assure the UK's industrial future and export opportunities for the long term.



Introduction

The future global market for low carbon technologies will be worth billions in decades to come. How soon this opportunity can be realised and what sectors may benefit hinges on the ability to channel new skilled employees into industry positions.

The demand for certain products and services in the energy sector to deliver Net Zero by 2050 will be significant, and this will be beyond any transformative change we have seen in generations. This is already placing huge pressures on the need for certain skills within our sector.

The UK Government have set a target for 2 million UK green jobs by 2030 and the 10 point plan has set out the foundations for a new **Green Industrial Revolution**[1], to **'pioneer new British Industry' and 'reinvigorate our industrial heartlands'.**

With the Government agenda and targets setting out the scale of the opportunity for growth in our sector BEAMA is taking forward work with our members to realise the full potential from our market between now and 2050.

The potential for new jobs in low carbon sectors has been set out in the Government 10-point plan. The 'nuts and bolts' of Net Zero include the cables, wires, and more traditional technologies we associate with the energy market, as well as new products and services within the scope of the electrical engineering industries that will drive the decarbonisation of our energy system. These products are often less reported on in the context of green jobs and future technology industries in the UK. Here we start to amplify the conversation around BEAMA's industry and the potential in our market for growth and increased demand for new jobs.

[1] https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

The key question now is will we have the availability of a skilled workforce to fill these roles and could this limit investment into the UK market for the growth of low carbon tech industries as we currently face a skills shortage in many areas of our sector.

Accelerating the shift to zero emission vehicles could deliver...

Support for around **40,000** NEW JOBS IN 2030

Around **3bn** OF PRIVATE INVESTMENT BY IN 2026

Savings of around **5mtCO_2e** to 2032 and **300mtCO_2e** to 2050

Developing greener buildings could deliver...

Support for around **50,000** JOBS IN 2030

Around **11bn** OF PRIVATE INVESTMENT BY IN 2020s

Savings of **71mtCO_2e** between 2023 and 2032, or **16%** of 2018 UK emissions

Extracts from the 10 point plan associated with BEAMA supply chains.

NOTE: The 10 point plan doesn't include investment and growth in the Energy Networks sector, which we believe will also be one key area of the market requiring growth and increase demand for a skilled workforce.

As reported by the UK Green Jobs task force[2] every job has the potential to be green, but as the task force have done, we categorise here 'green jobs' as those directly contributing to the achievement of Net Zero by 2050 in the UK. Under this interpretation BEAMA members will support a significant proportion of the future green jobs in the UK as we deliver the technologies and services integral for a Net Zero energy system.

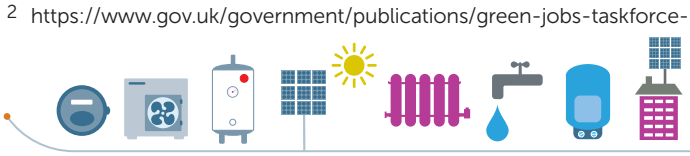
The task force reported that in order to meet this ambitious target of 2 million green jobs by 2030 we need to understand the current state of the green jobs market and skills challenge.

They called for industry to:

- ✓ invest in delivering Net Zero and our environmental goals
- ✓ build pathways into green careers for people from all backgrounds
- ✓ and ensure that workers and communities dependent on the high carbon economy are supported within the transition

Here BEAMA reflect on the current state of play in our sector and the challenges facing manufacturers in recruiting skilled employees for jobs that are vital to our Net Zero future in the UK. This is part of our ongoing work to support our sector in achieving the 3 objectives set out by the green jobs task force and remove barriers to entry into this exciting sector.

2 https://www.gov.uk/government/publications/green-jobs-taskforce-report



Our Industry

BEAMA is the UK trade association for manufacturers and providers of energy infrastructure technologies and systems. We represent more than 200 companies, from start-ups and SMEs to large multinationals. Our members' products ensure low carbon energy and environmental services are delivered safely, securely and efficiently to UK homes, businesses, transport and grid networks.

Our industry is responsible for **£13 billion of UK operations** and committed to delivering Net Zero by 2050[3]. We currently **employ 90,000** and as a sector we know growth will be required to ensure the delivery of Net Zero products and services for our energy system, by exactly how much is still to be full understood[4].

The scale
A snapshot of what growth looks like for our sector

National grid estimates a need to recruit **400,000** energy jobs between now and **2050**

260,000 of which will be new roles, while 140,000 will be replacing those who have left the workforce due to natural attrition[5]

There is currently **1GW** of battery storage deployed in Great Britain, with around **8GW** planned[6]

'Energy efficiency retrofit of the **29 MILLION** existing homes across the UK should be a national infrastructure priority'[7]

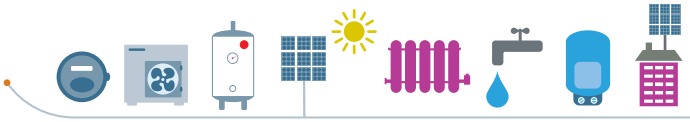
Construction Industry Board (CITB) estimate improving the building fabric energy efficiency of every building in the country in need of retrofit will require **12,000** workers to be trained every year for the next 4 years, before need to ramp up annual recruitment by up to 30,000 workers between 2025 and 2030. A total increase in trained workforce by **230,000** by **2030**[8]

Upper most estimates from system modelling suggest **30-40 MILLION** EV chargepoints will be needed in the UK by 2050[10]

By 2050, the domestic market for smart systems and flexibility solutions could be worth as much as **£1.3 BILLION** to GDP supporting around 10,000 jobs, while the export potential in 2050 could be worth as much as **£2.7 BILLION** and 14,000 jobs[9]

60,000 workers needed for heat pump installations in domestic and non-domestic buildings by **2028**[11]

3 BEAMA Climate Commitment, 2021 www.beama.org.uk
4 BEAMA, Energy Systems Catapult – Market Sizing for Net Zero, 2021 research project
5 https://www.gov.uk/government/publications/green-jobs-taskforce-report
6 https://www.gov.uk/government/publications/green-jobs-taskforce-report
7 Committee on Climate Change, 2019 – Net Zero – The UK's contribution to stopping global warming
8 https://www.gov.uk/government/publications/green-jobs-taskforce-report
9 https://www.gov.uk/government/publications/green-jobs-taskforce-report
10 BEAMA, Energy Systems Catapult – Market Sizing for Net Zero, 2021 research project
11 https://www.gov.uk/government/publications/green-jobs-taskforce-report



The **International Energy Agency** have recently reported on the requirements for clean energy jobs and associated growth between now and 2050[12]. Internationally they estimate **14 million jobs will be created by 2030** thanks to new activities and investment in clean energy.

They outline **5 million jobs will be lost with the decline of the fossil fuel industry** and make comparisons to the growth and losses across the energy sector employment market. It is clear the growth in the electricity sector will be significant.

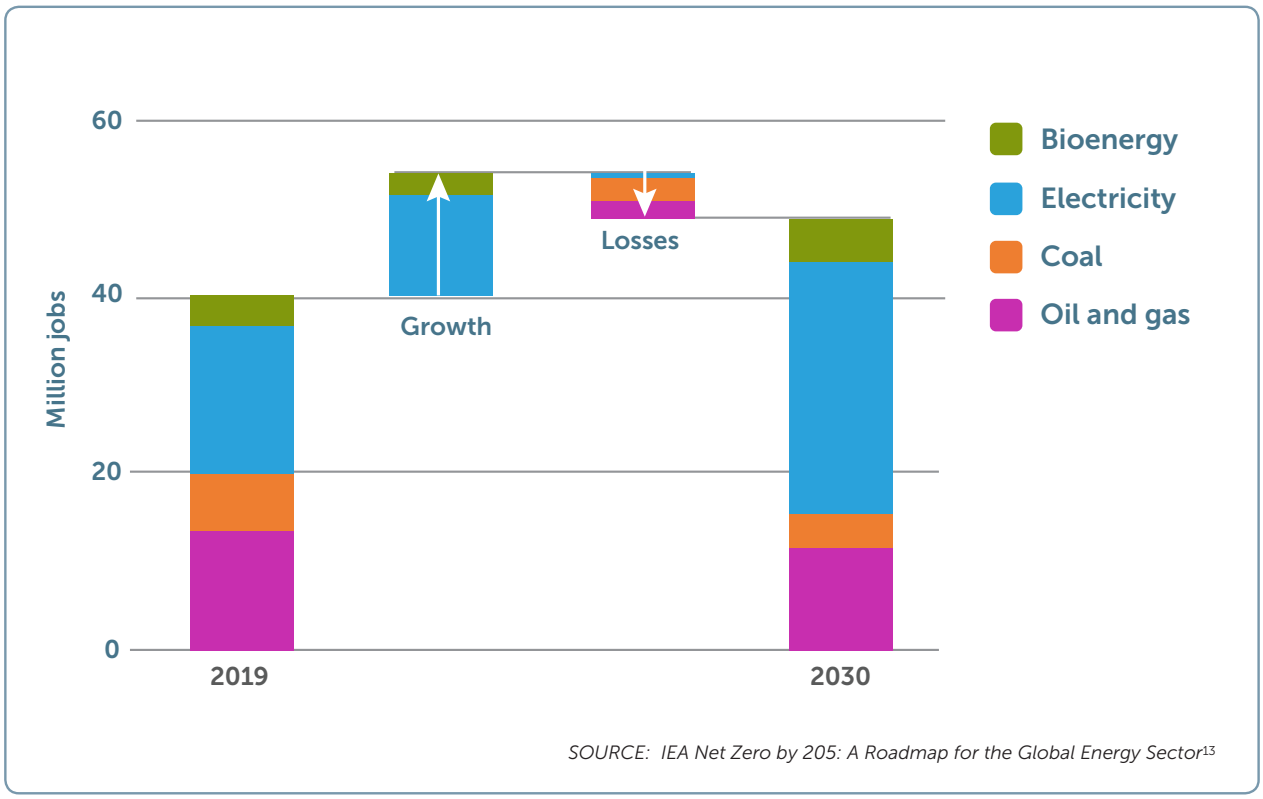
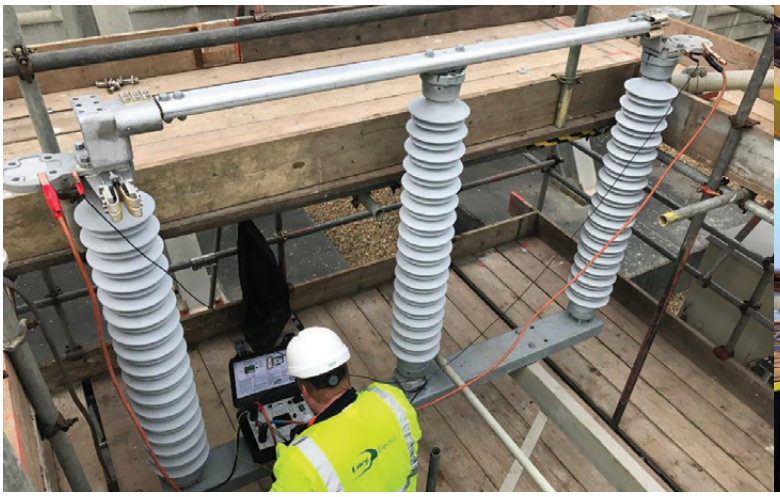


Figure 1 – *Global employment in energy supply in the Net Zero pathway 2019-2030*



12 Net Zero by 2050: A Roadmap for the Global Energy Sector – Event – IEA

13 Net Zero by 2050: A Roadmap for the Global Energy Sector – Event – EA

The growing skills gap – impact on market growth

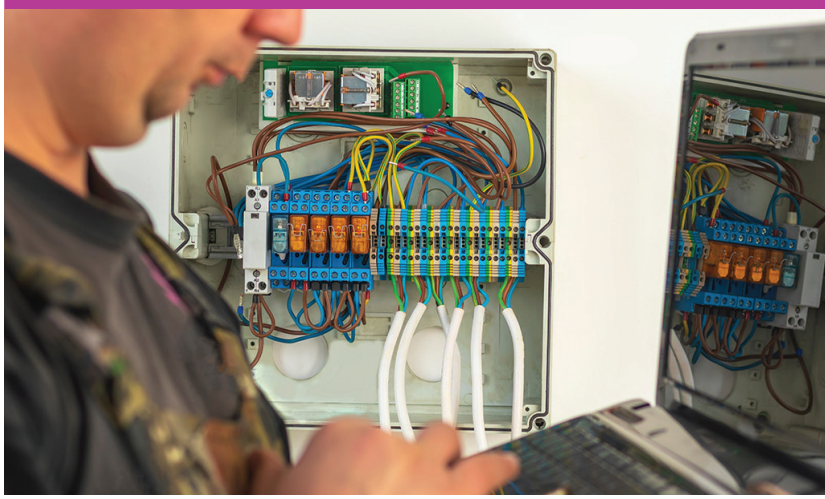
The essential skills listed below have been widely reported by BEAMA members in recent years and are essential to UK's efforts to meet Net Zero. We now need to be addressing routes to enable new entrants into the energy sector jobs market to fill these vacancies. This is not just about finding the skills, but also skills retention.

We are hearing from industry that there are many job vacancies and huge potential for expansion in certain R&D and innovation roles. However, this growth is held up by a lack of certainty in the marketplace (a separate but related topic we will be covering in other publications) and crucially a lack of available skills and people. Brexit and COVID have further exacerbated the impact of these skills shortages and recruitment problems.

IET Skills for Net Zero and a green recovery 2020 survey[14].

47% of engineering employers report currently having difficulties with the skills available to them through recruitment and their internal workforce

63% respondents think they can only partially address skills gaps – top reasons to not being able to effectively address skills gaps 49% 'we are under pressure to reduce costs' 35% 'competition in the marketplace/other sectors for workers.



The skills issues facing our industry are having a direct impact on the speed at which we can innovate and deliver the volumes of products needed to meet Net Zero. We know the volumes of certain technologies required to meet Net Zero by 2050 will be significant[15], and the workforce will therefore need to increase by several degrees of magnitude. This is a huge opportunity for the UK economy and jobs market. We therefore anticipate in many areas there may not be skills shortages now, but there will be in years to come and companies will need to recruit employees from outside of the UK in what will a very competitive global market for the same skills. Investing in education, training and recruitment resources now will ensure the UK industry can grow at a speed required to meet Net Zero and foster a workforce that will assure the UK's industrial future and export opportunities for the long term.

[14] https://www.theiet.org/impact-society/factfiles/education-factfiles/iet-skills-survey/iet-skills-for-Net Zero-and-a-green-recovery-2020-survey/
[15] BEAMA, Energy Systems Catapult – Market Sizing for Net Zero, 2021 research project

The cost of these skills can also be high which again can hinder further R&D and innovation. Critical to this is the market certainty provided by Government assuring investment in key new areas of technology development.

Many of the points raised in this report have been well reported in the UK Green Jobs task force and here we summarise the core skills gaps emerging in our sector specifically. Going forward BEAMA intend to support work with UK Government and The Institute for Apprenticeships to address these core skills gaps and effective pathways into the sector.

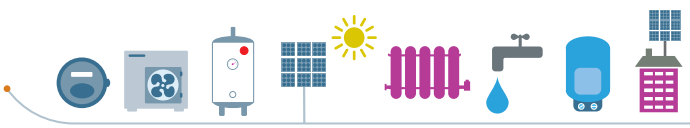
- **Engineering:** There are a wide range of engineering skills shortages in the market today. These include those required for the commissioning and manufacture of low carbon technologies, including heating, ventilation, smart infrastructure for buildings and the electricity network. Installation engineers for electric and electronic products to software engineers for the design and operations of products are all in increasing demand across the industry. Creating attractive training programs and an education system that attracts a young, diverse, workforce is essential to our Net Zero future.
- **Installers:** The requirement for installers extends right across the sector from buildings to energy networks. There is already a huge demand for qualified people for low carbon heat installations in buildings. If the UK is to reach the 600,000 annual heat pump installation target by 2028 we will need between 7,500 and 15,000 installers a year to be trained[16]. We estimate 30,000 installers will be needed by 2028. This compares starkly to the current 1,800 registered installers trained in the UK (compared to existing 130,000 fossil-fuelled boiler installers). EV charging infrastructure will also require a new installer workforce and there is a growing demand for skilled installers who can manage the more complex system architecture of a Zero Carbon Home[17]. Here we foresee huge potential for retraining an existing workforce, for example smart meter installers and gas engineers.
- **Property retrofit skilled professionals:** It is not just the installers we need to drive a national retrofit program for UK homes, but also contractors, architects, surveyors, and service engineers will all need to be equipped with the skills to assess buildings and suggest actions required to bring a property up to Net Zero standards. This is far beyond the level of regulatory assessments currently carried out in UK homes, as it will require a combined knowledge of system design, energy efficiency measures, building fabric, new energy services and health requirements (e.g.Ventilation, assisted living). For the scale of housing retrofit required to meet Net-Zero this will require a national training program at significant scale and qualified 'home energy assessors' will be needed with the holistic skills set to adequately advise and equip homeowners with the right information and guidance on how to retrofit their homes. Every home is different and therefore system design and the options suitable for different properties will vary considerably and this will require a significant level of training to achieve.

Friends of the Earth have reported widely on the green jobs that could be generated from the retrofit of UK homes to meet Net Zero, they state that this could generate 1 million jobs over the next 2 years, and provide the basis for recruiting and training green apprentices[18].

16 https://www.gov.uk/government/publications/green-jobs-taskforce-report

17 BEAMA, Energy Systems Catapult – Market Sizing for Net Zero, 2021 research project

18 An emergency plan on green jobs for young people | Policy and insight (friendsoftheearth.uk)



For a lot of retrofit requirements compliance will be driven through the UK building regulations. Ensuring guidance and information is available for installers to follow these regulatory requirements is essential (E.g. better guidance is already needed on different heating appliances e.g. weather compensation, boiler commissions, system balancing). In addition to this many new requirements under the building regulations will be vital in driving up heating system efficiency but without adequate associated training these new improvements will be missed.

- **Digital and data:** All products in buildings and on our energy networks are increasingly containing a digital connected element and this is essential for meeting Net Zero and facilitating the uptake of flexible energy services. With the growth in the Internet of Things (IOT), and connected devices, digital and software engineering skills are one of the largest growing sectors in our industry. With this comes a requirement for skilled professionals with expertise in cybersecurity and data management. Many industry experts are reporting the requirement for data analytics may be widely underestimated as the increase in digitally enabled products and services will generate huge volumes of data. Mining this data and information to identify trends and translate this into solutions for our Net-Zero future will be an essential task in our fight against climate change.
- **Standardisation:** With R&D and innovation comes a growing need to drive the creation of new and amended industry standards. This is a highly valued skill in industry but a role we now struggle to fill. Through Trade Associations companies can assign industry experts to sit on technical committees within the British Standards Institute, or other European and international standards bodies to provide industry input into the creation of standards. This is an essential role, and an important part of the UK's work to create a flourishing green economy and associated growth in new technology markets. The world of standards making hasn't in the past been well advertised as an opportunity for career development. We need to be opening this opportunity up to young engineers entering the sector to help them further advance their professional skills and ensure we have the right people determining the future of the market.

Pathways to green jobs

More work is needed between Government and Industry to determine the best routes to develop and fill the above skills gaps and channel skilled professionals into the sector. The scale of this challenge warrants a national program and co-ordinated effort. Manufacturers have in the past, and will continue to, drive their own initiatives and training schemes but this won't be enough to ensure the UK's 2 million green jobs target can be met and our industry can invest in the capacity needed to manufacture the technologies required between now and 2050. So, what are the options?

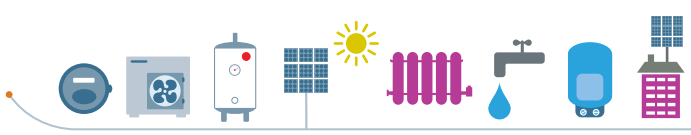
Training

Manufacturers will continue to drive their own training schemes but to address the scale of training required for housing retrofit, digital engineering, data analytics as a snapshot of key priority areas, a national program is needed to ensure capacity is met. This is not just about one-off training but ensuring skilled employees in the sector have continual access to training schemes to keep their qualifications up to date and keeping pace with technology innovation. The structure of future training schemes in these areas will therefore be a key factor in ensuring the retention of a skilled workforce in the UK, and the transference of a skilled workforce from high carbon to low carbon sectors.

It is vital that we also maintain the quality of work from a trained workforce. This is especially pertinent to the scale of work required to retrofit UK homes to a Net Zero standard. We need to ensure the quality of installation and associated training in the market meets certain standards to assure the safety and efficiency of UK homes. Trustmark is a known and suitable route for this quality assurance for installers.

The scale of the challenge is huge, especially when you look at the training requirements for heat pumps as a current example of progress to be made (30,000 trained heat pump installers by 2028). Industry have acknowledged they have capacity to train 7,000 new installers per year (it will need to ramp up to this level over the course of several years). So there is potential capacity to deliver the 600,000 heat pumps per year by 2028.

We ask Government to collaborate with Further Education Institutions and help industry engage with them to ensure there is a focus on low carbon heating training to establish and maintain the high standards and rapid deployment in heat pump installation. This is not just about heat pumps and we will need more certified inspectors and installers to work on domestic electrical wiring to ensure capacity for increased electrical demand and provide assurance of its safety.



A CIPHE survey from 2020[19] found that of the 232 colleges surveyed throughout England, Scotland and Wales, only 5 offered low carbon heating training, but all offered gas heating training.

Colleges and manufactures will only support training if they see demand from installers and the marketplace. This is the root of the problem facing the UK's delivery target for heat pumps. Installers are yet to demonstrate this demand as they don't see significant value in this training and the associated heat pump installation market. If we are looking at re-training existing gas engineers, the boiler installation market is still a more profitable option.

Installers need market certainty from long-term policy and clear government support packages

Graduate engineers

As an industry we are already working with universities to scope the degree courses suitable for the growth in green jobs in the market, and more can be done to promote the benefits of working within the sector. Electrical engineering plays a crucial role in mitigating climate change and communication between industry and universities should continue to determine how supply of graduate engineers can meet demand.

Primary and secondary education

Careers material should be shared with schools to help students understand the opportunities within different associated 'green' sectors.

Apprenticeships

Apprenticeships have historically been a key pathway into skilled professions in industry. For a period the emphasis and support for apprenticeships has diminished and we need to now ensure a pathway to better utilise the Levy in the UK and scope priority sectors, supporting green jobs critical for Net Zero.

Friends of the earth call for a rapid rollout of a green apprenticeship scheme, costing £6.2-£10.6 billion in total funding over 5 years. This would cover the wages and subsidies at 50% or full training costs and diversity funding. Such an investment would be a natural successor to the furlough scheme and compares well to the lost earnings of the youth unemployed which could amount to £105 million in lost local earnings for an average-sized local authority in England and Wales[20].

[19] CIPHE survey, 2020 https://www.ciphe.org.uk

[20] An emergency plan on green jobs for young people | Policy and insight (friendsoftheearth.uk)

Re-training an existing workforce

The volume of installers and skilled engineers won't come from new entrants to the employment market alone, and there are huge benefits in retraining an existing workforce who will bring transferable skills to the industry. This is also an essential part of a Just Transition to Net Zero, ensuring existing employees in high carbon industries are not left behind and can seek more opportunities in the green jobs sector. We need to focus on reskilling those in high emitting industries and sectors that will be essential to the delivery of Net Zero.

Examples include existing smart meter installers and gas engineers, who will have the essential skill sets to deliver a national retrofit program for Net Zero, but will require additional training for new technologies and the holistic approach now required for building retrofit.

We should be looking at pathways from digital and software sectors into energy engineering, as well as pathways from the oil and gas industry to renewables and low carbon technology development.

In markets like ours, experiencing high levels of growth, it is not just the technical expertise that will be required but good leadership, management and human resources will become an essential par of co-ordinating growth at this scale. We can learn a lot here from other sectors and open the doors for new and exciting management roles.

Net Zero and its associated transformation of the built environment, energy management practices and associated services is a complex and difficult topic to explain to the public. For such a vital transformation of our lives good marketing, communications and social scientists will be a vital part of the team to deliver this transformative change effectively.

1,800

trained heat pump installers in the UK (compared to 130,000 fossil-fuelled boiler installers) The industry will need another 30,000 installers by 2028

Compliance and enforcement

BEAMA have been involved in the development of Competent Persons Schemes (CPS) with NICEIC related to our Ventilation Industry and associated training in the past. We know the uptake of CPS has direct links to a lack of enforcement of the building regulations. This is a problem seen in other parts of our industry, where lack of enforcement leads to low take up of training and therefore compliance with industry standards and regulations. We believe this is a fundamental issue to be resolved as we see a growing demand for trained installers working in UK households, and to ensure pathways for new skilled jobs remain open.

Recommendations and conclusions

We need to open new, and improve existing, pathways into the jobs market for our sector, directed at the areas facing the highest skills shortages currently, and those requiring growth to deliver the UK's Net Zero target. Ensuring a wide range of pathways are supported into the market will facilitate diversity in the workforce across the industry and at all levels of seniority.

Here we need collaboration with Government and the education sector to link engineering qualifications with parts of the industry and drive the uptake of engineering qualifications that are needed.

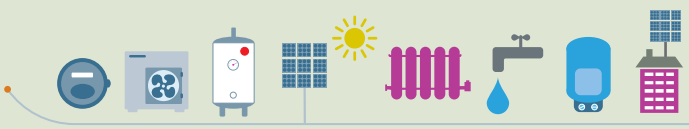
BEAMA fully support the work conducted by the Green Jobs Task Force and the recommendations set out in their final report. In follow up to this work we suggest the following actions:

1. BEAMA will work with our membership and Government (inc. the Institute for Apprenticeships) to gather data on not only the existing workforce and job availability, but to map out the future requirements for skills, how these are changing and the pathway options to bring skilled professionals into the sector.
2. This data will then inform a sector plan and strategy to address the skills gaps, working with Government and educational bodies as part of the Government's Green Jobs program to determine a way forward.
3. We need to work collaboratively with Government and education bodies to promote the engineering sector as a core profession for mitigating climate change. As part of this we should work with sector bodies and organisations to provide more support for young engineers entering into the sector and enable their professional development. This includes promoting opportunities including the development of international industry standards.
4. Building retrofit to bring UK homes up to a Net Zero standards will require a workforce at significant scale and this needs to be driven through a national program, supported by Government. BEAMA members are committed to working with government in developing this and supporting the training of installers, assessors, and creation of other key skills.
5. Improve overall compliance and enforcement. With such a dramatic reskilling and training program across the UK it is essential we enforce safe and compliant installations. Enforcement is an essential way to ensure a level playing field for manufacturers in our industry. It is also a critical factor in ensuring consumer's experience of decarbonising is a positive one, leading to improvements in quality standards and overall safety. The systemic and culture change around building safety is underway but to date the financial resource earmarked by Government is not sufficient for regulatory structures or enforcement. Enforcement of the new system is critical to ensuring a level playing field but more importantly the culture change that will save lives.

There is a sense of urgency in our industry to increase the capacity for training and availability of skills in our sector. These future skills and roles need to develop through the education system as a matter of urgency if we are to bring suitably skilled people through to the market and provide opportunities for young people.

As a country we need to rebuild our emphasis of cultivating and retaining talent within high-tech industries. The recent targets and strategy documents from Government set out a clear ambition to do so but the devil is in the detail. We now call for urgent action to work with UK Government and the Green Jobs Task Force to determine what's needed to deliver this.

[22] BEIS Public Attitudes Tracker Wave 35 (publishing.service.gov.uk)



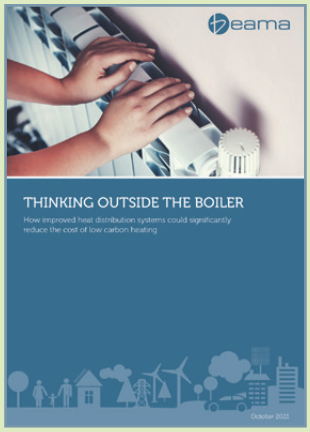
BEAMA will be publishing more work in coming months drawing on the issues raised in this report, and in the development of a thorough market review of skills requirements between now and 2050.

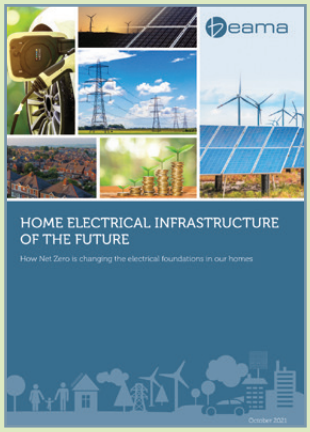
Investment in new jobs and training is driven by market growth in the UK. For this our industry needs market certainty to assure further investment in the UK and the growth of low carbon technology sectors. For many parts of our sector this is not apparent and until policy and regulatory certainty is determined for key areas of the market the level of investment needed to ensure the growth of green jobs will not be met. Market certainty will lead to investment in people and training for the sector we need to meet Net Zero. Without this that investment will move to other markets in other countries.

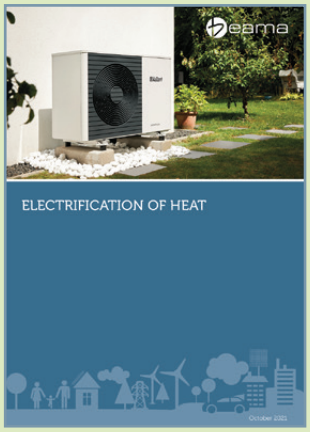
The government's aim to make the UK a leading nation in low carbon technology development won't happen without a skilled workforce. It's an exciting time to be working in our industry and the opportunities are great. We are keen to harness this and nurture new industrial progress.

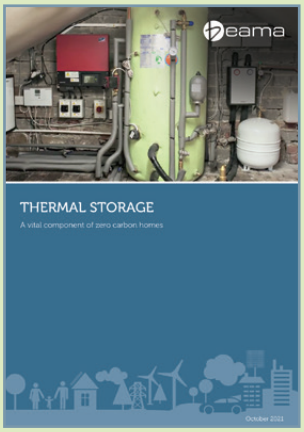
To read more, download the BEAMA *Net Zero by Design Main report and white papers*

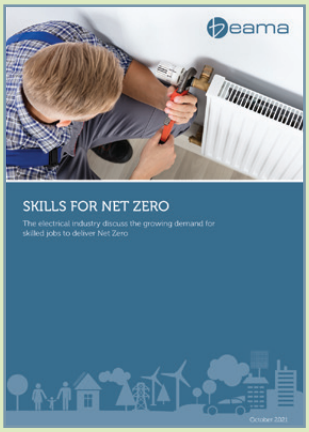
CLICK HERE











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