# 2021 Vision:

## The Future of the Electrical Contracting Industry

NICEIC

ECA

Representing the best in electrical engineering and building services

# Welcome to *2021 Vision: the future of the electrical contracting industry*

*2021 Vision* was conceived and has been jointly funded by our respective organisations. As leaders in our industry, NICEIC and ECA must provide the vision and leadership the industry desperately needs.

The backdrop to this report is worth revisiting; in the first half of 2008 few would have predicted the vast economic changes that have affected our world. The impact of the deepest recession since the 1930s on the UK economy has been immense and the electrical contracting industry has not escaped.

Electrical contracting companies of all sizes have therefore found it extremely difficult to plan for the short term, let alone the middle to long term. *2021 Vision* enables the electrical contractor to see past short term survival and prepare for the next stage of their business development. Certainly, there are many threats, but there are many more opportunities.

*2021 Vision* identifies the likely scenarios which will shape our industry over the next 10 years. It highlights the character and structure of the wider construction industry, the economic outlook, client and main contractor requirements, the range of work which is likely to be undertaken, the knowledge and skills which may be required and key product development and installation trends.

ECA and NICEIC will ensure *2021 Vision* is available to all of our industry and recognise that by working in partnership on common issues both the ECA and NICEIC can better serve our customers and the industry.

We truly believe *2021 Vision* can provide the strategic foundations in building a secure and profitable future for the electrical contracting industry.

Emma McCarthy
CEO
NICEIC

Steve Bratt
CEO
ECA

**NICEIC** is the UK's leading voluntary regulatory body for the electrical contracting industry and maintains a register of over 25,000 competent electrical contracting companies. Electricians registered with NICEIC are assessed on a regular basis to ensure high standards and employing an NICEIC registered electrician is the best way to ensure a safe job.
**Visit www.niceic.com**

ECA
Representing the best in electrical engineering and building services

The **Electrical Contractors' Association** (ECA) represents the interests of 3,000 member companies involved in electrical installation work. Collectively, they have an annual turnover of more than £5 billion, employ over 30,000 operatives and support 8,000 apprentices in craft training. The role of the ECA is to provide a focus for the electrical industry in terms of safety, training, qualification, technological development and industry performance. Furthermore, work carried out by ECA contractors is guaranteed under the ECA Guarantee of Work Scheme.
**Visit www.eca.co.uk**

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# 1. Management Summary – The UK in 2021

## Broad Objectives

- To produce a research document which considers what will be required in the electrical contracting industry over the next 10 years.
- To provide direction for development of future strategy to develop skills and services required for electrical contractors.

## Report Objectives

To identify likely scenarios representing the shape of the electrical contracting industry in 10 years time, looking at the following aspects:

- The shape and structure of the wider construction industry
- The economic outlook for the construction and electrical sector
- Client and main contractor requirements
- The range of work that is likely to be, or could be, undertaken by electrical contractors
- What knowledge and selling skills the contractor may need
- Green skilling
- Product development and installation trends
- Conclusions

Electrical contractors could develop their skills and knowledge of heating and lighting control techniques in order to provide energy efficiency services, or become Green Deal or Green Energy installers, replacing other trades.

## The Opportunities

Although there will only be modest growth in the construction market, the sustainability agenda will provide significant opportunities in renewable power generation as the programme to upgrade the UK's existing building stock gets underway. Work will be required on virtually every building in the UK, with demand for systems to minimise energy consumption requiring the skills of electrical contractors for installation.

The government has said it will encourage increased use of small and medium sized contractors on public sector projects, providing new opportunities for many electrical contractors.

SMART meters will be installed in every home and many buildings will incorporate remote control monitoring with high speed internet allowing specialist centres to take charge of this on behalf of building occupants. With far greater use of high-tech electrical systems, demand for electrical and communication installations will be high both for installation and when they fail.

Installation of local neighbourhood power generation and vehicle charging networks will provide new opportunities for electrical contractors, as will the growth of high speed broadband with networks in every building.

Electrical contractors could develop their skills and knowledge of heating and lighting control techniques in order to provide energy efficiency services, or become Green Deal or Green Energy installers, replacing other trades. As well as installation services there will be opportunities for electrical contractors to become Green Deal Assessors.

The electrical contracting industry has the opportunity to build a reputation for expertise and provision of impartial advice, becoming more influential. Electrical contractors can work as advisors in a problem solving role, assessing buildings to determine work required, then fitting new systems and components. There is also an opportunity to instruct building occupants on how to use their systems.

It can be expected that demand for electricians will exceed supply and it will be harder for unskilled electricians to operate. In response to the skills shortage the government will encourage apprenticeships, with new forms of funding.

## The Challenges

The high cost of raw materials, in particular copper, will see changes to the traditional products used including the way that buildings are cabled. The drive to reduce construction costs will be apparent in changes to the supply chain, with specialists like electrical contractors expected to change working practices to allow greater efficiency. This will involve working more closely with both the designer and the main contractor and often dealing with more knowledgeable customers.

Legislation will change, with higher levels of contractor certification required. There will also be a need to keep up to date with new technologies and systems, many of them resulting from the drive for sustainability.

The electrical contractor will need new skills – failure to develop these will lead to replacement by other trades. This will be helped by a de-skilling on site as more equipment becomes plug and play, connected with pre-formed cables or bus bars.

# What you told us – Summary of the NICEIC and ECA survey

- More training for small businesses in new technology and skills – 97% consider this to be an opportunity
- New products to enable sustainable new build and renovation of existing properties – 96% consider this to be an opportunity
- Green Deal leading to upgrading 500,000 homes per year – 96% consider this to be an opportunity
- SMART meters in every home – 95% consider this to be an opportunity
- More apprenticeships – 95% consider this to be an opportunity
- Public confidence in competency of contractors – 94% consider this to be an opportunity
- Local renewable energy and power network grids – 94% consider this to be an opportunity
- Intelligent buildings with integrating control systems – 94% consider this to be an opportunity
- 15% of UK total energy to come from renewable sources by 2020 – 93% consider this to be an opportunity
- New skills required for installation and maintenance of new technology – 92% consider this to be an opportunity
- Funding for training via Further Education Loans – 88% consider this to be an opportunity
- Computer literate multi-skilled workers who understand how differing trades must fit together – 77% consider this to be an opportunity

- Greater use of wireless technology – 76% consider this to be an opportunity
- Increased certification of contractors – 71% consider this to be an opportunity
- New forms of procurement and contract between main contractor and sub-contractor – 64% consider this to be an opportunity
- Changing government policy – 51% consider this to be a threat
- Crossover of trades requiring multi-skilling – 60% consider this to be a threat
- More competitive industry – 61% consider this to be a threat
- More components in new build manufactured off-site, reducing amount of skilled craftsmen on site – 79% consider this to be a threat
- Lower skilled workforce doing work currently done by tradespersons – 98% consider this to be a threat

# 2. Social & Economic Influences

**Key Issues:**

- High cost of energy, changing attitudes
- Increasing importance of renovation and refurbishment
- Restricted availability and high cost of raw materials
- Drive for sustainable construction
- Housing shortage
- Influence of the internet

**Opportunities**

- Steady but modest growth in the construction market
- Growth in renewable and local generation
- Upgrading energy efficiency of existing buildings
- Big demand in requirements for systems to minimise energy consumption
- Use of the internet for remote building control and monitoring
- Internet allows customers to obtain information about systems and components and communicate about suppliers

**Threats**

- High cost of raw materials
- New and different competitors entering the market
- Changing customer types and needs
- More control held by knowledgeable customers

**futureview**

Over the next 10 years the construction market will show only modest growth, with more than half of activity focused on repair, maintenance and improvement. The value of electrical contracting will increase due to demands for more energy efficient buildings as a result of the increasing energy prices and possible shortages. Customers will be more knowledgeable and, with the rising price of raw materials driving up the cost of construction, they will be encouraging greater competition. There will be opportunities for the electrical contractor who adapts to these changes.

15% of power generation is expected to be from renewable sources, some via local networks.

## Raw Materials

Availability and price of raw materials will come under significant pressure as a result of dramatically increasing demand from the growth of world economies such as China and India as well as falling productivity from many sources. This will impact on oil, copper and rare earth metals driving up prices of many products and components. This in turn will drive up the cost of construction.

## Energy Supply

It is estimated that £200 billion needs to be spent to ensure the security of the UK's electricity supply.[1] Many of the existing UK power stations will need replacing by the middle of the current decade as they will not meet EU standards of pollution control. This does not look possible at present and there is a potential threat of power shortages by 2016. This will lead building owners to look for alternative sources of energy.

The government intends to reform the electricity market to encourage low carbon generation,[2] ensuring a range of alternatives. 15% of power generation is expected to be from renewable sources, some via local networks. A further proportion will be nuclear. As we look forward there are a number of unresolved issues, particularly behind nuclear power but it has been assumed that the government will resolve these to avoid the prospect of power outages in the lead-up to a general election.

Prices of energy will continue to rise driven by an imbalance between reducing supply and increasing demand but also because of additional taxation used as a means of both curbing demand while providing a convenient source of revenue. Factors such as the current instability in the Middle East will merely accelerate the speed of price increases. This will create demand for systems which minimise energy use and allow integration of renewables into the National Grid. It will also encourage the practice of commercial building energy audits and labelling.

Qualified, independent energy advisors will drive decisions to upgrade or change existing energy consumption in both residential and commercial premises. Energy management services will also be provided to building users, using SMART (Self Monitoring, Analysis & Reporting Technology) meters to control systems remotely. By 2020 all UK households will be fitted with SMART meters allowing a "SMART grid" to be developed. In addition to the work of installation, there will be a requirement to install data cables to gather information about equipment usage. These services could be provided by the data and telecom companies.

The proportion of buildings which have their own renewable power sources and energy storage will be significant, driven by the Green Deal, high energy prices, Feed-In Tariffs and the desire to avoid dependence on the National Grid with possible power disruption. Ownership of systems may not be with the building owner but third party provider/managers operating a number of schemes to achieve pay-back.

Despite having more electrical equipment, individual households will consume less electricity than now. This will be achieved through better energy management and more efficient electrical equipment. However the total number of households will grow by 14% between 2008 and 2021, creating a requirement for an additional 237,400 homes each year and higher overall energy demand.[3] New build housing output has been at a rate below population growth for some years (current output is producing half the number of homes needed).

At the time of writing, a solution to this is not evident. It can be expected that there will be a move to bring empty housing stock back into use. Current government estimates are that there are 300,000 empty homes[4] in the UK. Another response to this shortage of demand could be to increase the number of multi-occupancy buildings built.

[1] LCN Fund: Creating Britain's low carbon future today. 2010

[2] HM Treasury/BIS: The Path to Strong, Sustainable and Balanced Growth. November 2010

[3] CLG: Household Projections, 2008 to 2033, England. November 2010

[4] CLG: New incentives to tackle the blight of empty homes. January 2011

## Energy Efficiency

The Green Deal, currently in development, will be a heavily funded programme aiming to improve the energy efficiency of homes and commercial premises. For this to succeed householders and businesses will have to be offered upgrade solutions which minimise disruption and are convenient to install and use. Creating work for the electrician, there will be the need to integrate systems previously handled by different trades. The entry of large consumer names, such as supermarkets and other high street retailers, could see a restructuring of the industry. System manufacturers will introduce networks of registered installers. All of this will increase commercial pressure on the small firms.

## Building Refurbishment

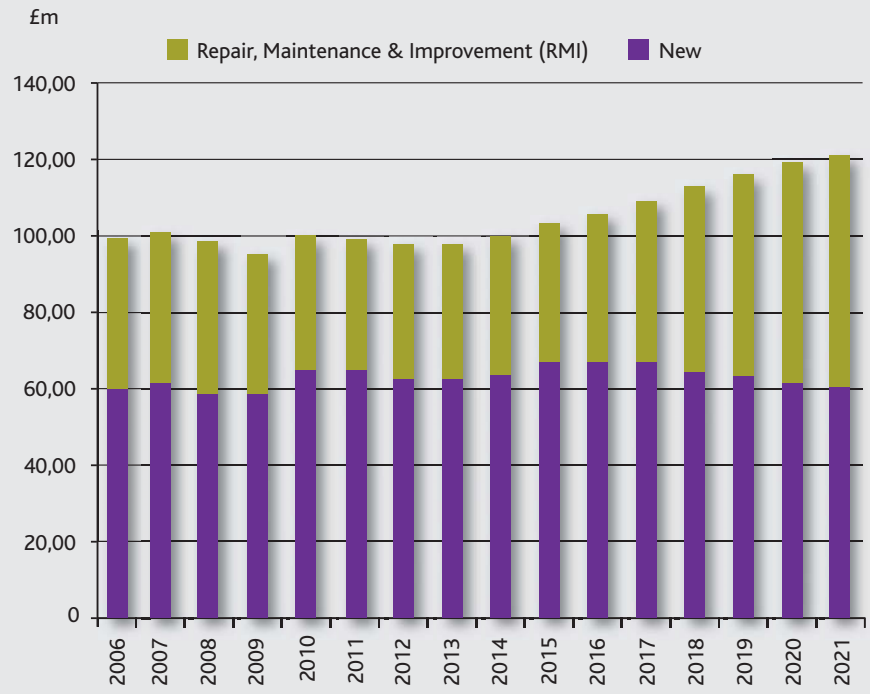
There will be an increase in the refurbishment of both residential and non-residential property. This will be a major contributor to growth in the construction market and provide more immediate opportunities to the electrical contractor. New build construction will fall in both proportion and actual numbers in the lead up to 2021 as the government's new build hospitals and schools programmes are completed. Infrastructure work will continue as a major contributor to new build activity as the country's ageing infrastructure is brought up to date. This should provide work for SMEs as the government has committed to award them 25% of government contracts.[5]

## Construction Market

In projecting the level of construction activity in 2021 the long term trend from 1955 to 2007 has been used. It has been assumed that the proportion of refurbishment will increase. Estimates for the size of the electrical contracting market have been based on the assumption that it will remain at a similar proportion of total construction activity.

There will be an increase in the refurbishment of both residential and non-residential property. This will be a major contributor to growth in the construction market and provide more immediate opportunities to the electrical contractor.

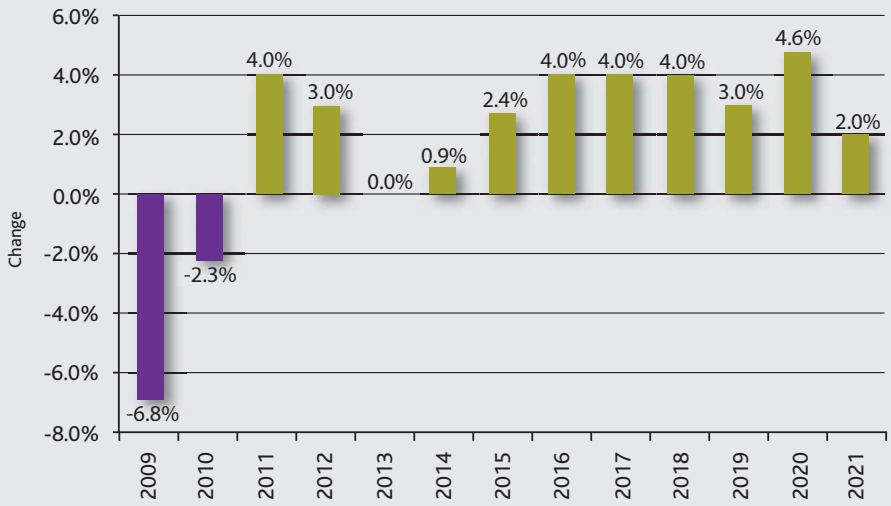
Fig 2.1: UK construction market projections




*Source: Construction Products Association. Competitive Advantage*

[5] HM Treasury/BIS: The Path to Strong, Sustainable and Balanced Growth. November 2010

Fig 2.2: UK electrical contracting market changes




*Source: Electrical Contractors Association. Competitive Advantage*


...we can expect broadband internet to be 100 times faster with many new forms of information delivery. This will enable the growth of social networks such as Facebook, LinkedIn and Twitter allowing consumers to more easily share information about products and service providers.

## Social Issues and Influences

As energy becomes a scarce resource there will be a need to re-educate the population in its use, requiring education programmes at school, home and work. This could be driven by energy providers, system manufacturers and electrical contractors.

Currently only 1.4% of the construction workforce are women in non-administration roles.[6] It can be anticipated that there will be more women working in electrical contracting by 2021 as a result of pressure for a balanced workforce and as a result of retraining to meet skills shortages. This will also respond to a need from some ethnic groups and women-only households that do not want men entering the home to undertake work.

How people interact with each other and the relationship between customers and suppliers will also evolve, driven by the internet which represents a key opportunity for the industry. By 2021, as a result of projects such as The Photonics HyperHighway,[7] we can expect broadband internet to be 100 times faster with many new forms of information delivery. This will enable the growth of social networks such as Facebook, LinkedIn and Twitter allowing consumers to more easily share information about products and service providers. Already holiday feedback sites are replacing traditional systems for rating hotels, this will expand to cover most services. As a consequence failures in quality of service will become public very quickly. This method of recommendation will also replace traditional forms of advertising trade services such as Yellow Pages.

### What you told us – The NICEIC and ECA survey

*"In 10 years time I still think it will be very competitive. There seem to be more electricians setting up their own companies after recent unemployment."*

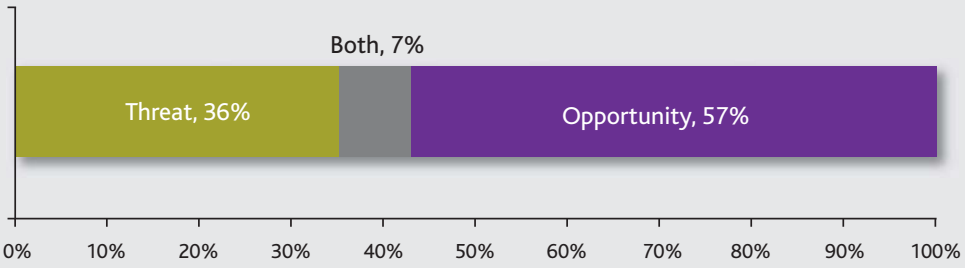
*"The belief is more smaller companies will emerge from larger companies, i.e. one man bands. The use of more "agency" type labour will drive away the directly employed operatives as this usually reduces labour costs which generally is where competitive tender costs differ."*

*"After this recent "bust" there has been a serious re-think within the company and we are more likely to diversify."*

6 CIOB: The Changing Role of Women in the Construction Workforce. September 2006

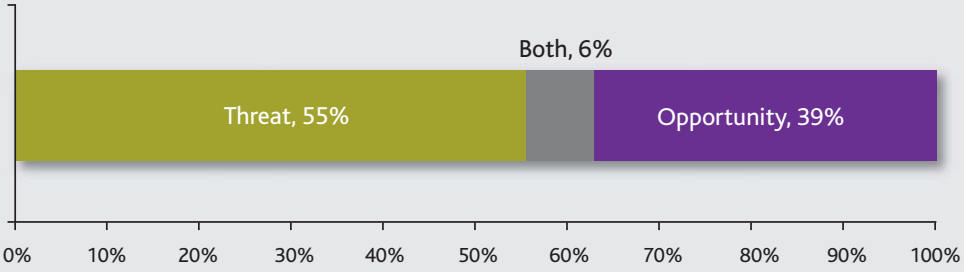
7 BIS: Pioneering research could make the internet 100 times faster. January 2011

Fig 2.3: New forms of procurement and contract between main contractor and sub-contractor – Opportunity




*Source: Online industry research 2011 – see appendix 5*

Fig 2.4: More competitive industry – Threat




*Source: Online industry research 2011 – see appendix 5*

Estimates for the size of the electrical contracting market have been based on the assumption that it will remain a similar proportion of total construction activity.

# 3. Political Influences, Legislation and Regulations

**Key Issues:**

- Compliance and enforcement
- Government policy driving change
- EU policy influencing installations
- Simplification of regulations
- Building Regulations 2019, Part P
- Amendments to the 17th and publication of the 18th Edition of Wiring Regulations (due 2019)

**Opportunities**

- Legislation will increase the size of the market
- Electrical contractors more influential
- Electrical contractors could replace some trades
- More renewable energy sources in buildings
- Installation of vehicle charging networks
- Higher demands for energy efficiency
- Harder for the unskilled electrician to operate

**Threats**

- Need to understand legislation
- Higher levels of certification required
- Working practices changed to allow greater efficiency
- Continuing drive to reduce costs
- Electrical contractors may become marginalised

**futureview**

Government policy is driving towards simplification of regulations as well as harmonisation of EU standards. It remains to be seen if Part P will become stronger or weaker as a result. However there will be other measures to introduce codes of practices and certification for all contractor categories which should strengthen the position of the fully qualified electrical contractor.

Building Regulations will demand that buildings are increasingly energy efficient, creating opportunities to install renewable energy systems. Crossover of trades will create opportunities for electrical contractors who are prepared to add new skills, but will marginalise those who are not.

## Political Influences

The desire to reduce carbon emissions, introduced by the last government and continued by the coalition, will impact on the way we all live our lives in the future. As electricity is the principal 'clean fuel' it will become even more influential in the future, providing opportunities for electrical contractors and related installation professionals.

## Legislation

Legislation already initiated by the government includes the aim for 30% of electricity supply to be from renewable, of which 12% of heating and 10% of transport would be renewables.[8] This will be encouraged by initiatives such as Feed-In Tariffs and renewable heat premium payments.[9] As a further incentive taxes on less efficient forms of energy can be expected. All of this will increase demand for electrical components and increase the size of the electrical market.

The European Energy Performance of Buildings Directive and the European Energy Related Products Directive will impact on the electrical industry, requiring installations such as water heaters to have an efficiency rating clearly displayed. This will contribute to consumer awareness, but probably only to a limited extent, with the electrical contractor continuing to be relied upon to recommend suitable products.

## Regulation

The government has a major impact on building design and construction via Planning, Building Control and procurement. In its planning policy review in 2007[10] the government marked a change in policy as renewable elements became a requirement of planning approvals. Despite the change of government and the development of Localism this has not changed. The present government's philosophy is to retain the existing raft of Planning Policy Guidance and Statements, but simplify them over time. By 2021 although simplified, there will still be emphasis on renewable and sustainable construction.


There will be the need to build a network of battery changing facilities and charging hubs around the country, presenting a major challenge for infrastructure and system capacity.

The government's principal tool for changing methods of building construction is the Building Regulations. It has already implemented a low carbon agenda via the Code for Sustainable Homes, Document L and Document J of the Building Regulations. By 2021 Document L will have received three further revisions, and Documents J and P two revisions. This will have made homes far more energy efficient and fundamentally changed some aspects of design.

The current Part P of the Building Regulations may change its form as a result of the de-regulation process, although a mechanism to provide regulation and safety in the market will still be required. Demonstrated competence in carrying out electrical installation work will become more important as installations become more technically complex and those carrying out such work will have to become multi-skilled.

The IEE Wiring Regulations (BS 7671) will have been subject to several amendments. Additional sections on energy efficient installations and vehicle charging systems can be expected.

## New Initiatives

As the transport industry moves towards replacement of petrol/diesel fuelled vehicles, cars will become 'decarbonised' and electrical vehicles more common. As a result there will be the need to build a network of battery changing facilities and charging hubs around the country, presenting a major challenge for infrastructure and system capacity.

As part of its Green Deal programme the government will be establishing a code of practice for installers based on existing best practice and industry standards.[11] Certification bodies will be required to check installers against these requirements. It is anticipated that by 2021 this will become standard practice and homeowners will come to expect any tradesperson working on their homes to have a form of certification. This should contribute to a general rising of standards.

8 DECC: The UK Renewable Energy Strategy. 2009

9 DECC: The Renewable Heat Incentive. March 2011

10 HM Government: Planning for a Sustainable Future. May 2007

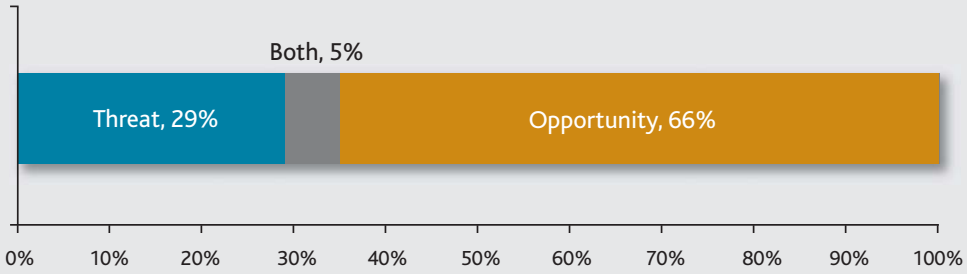
11 HM Government: Energy Bill. January 2011

The government is also exploring how procurement processes can be streamlined to drive efficiency and reduce cost via Infrastructure UK.

There has been a drive by government since the Latham Report in 1994 to improve the construction process and encourage cross-functional teams. This was more recently echoed in the IGT report which stated that an overlap was needed not only between trades and professions, but between suppliers, manufacturers and construction firms.[12] This could see a change in the way parts of the construction team work together to design and construct buildings, changing the relationship between the electrician, other trades, specialist contractor and the engineer. Rather than using legislation to achieve this it is likely to be encouraged via public sector projects.

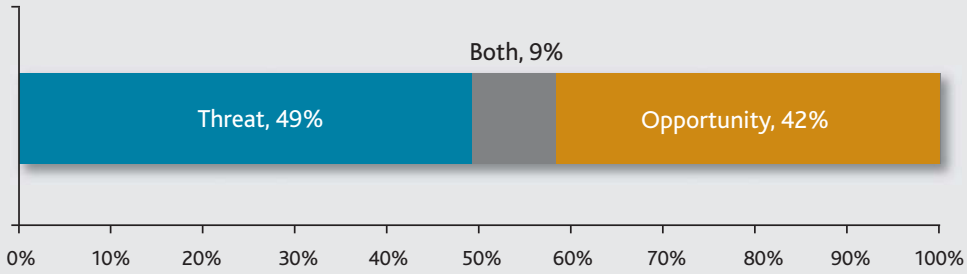
The government is also exploring how procurement processes can be streamlined to drive efficiency and reduce cost via Infrastructure UK who are looking to save at least 15% in procurement of infrastructure.[13]

Fig 3.1: Increased certification of contractors – Opportunity




*Source: Online industry research 2011 – see appendix 5*

Fig 3.2: Changing government policy – Threat




*Source: Online industry research 2011 – see appendix 5*

## What you told us – The NICEIC and ECA survey

*"It is too easy to start trading in the industry without the essential qualifications. Consequently there are too many companies operating in the market so that focus on survival against the uneven playing field and unreasonable competition rather than on progress becomes the culture. This encourages parochial attitudes and low margins and consequently stifles growth."*

*"The Industry needs to be more focused on working together and amalgamating to pool resources and knowledge and get the recognition of Part P for Electrics on a par with Corgi/Gas Safe for the Boiler Industry – we are a long way from this – and we should aim to be ahead!"*

[12] HM Government: Low Carbon Construction Innovation and Growth Team, Final Report. November 2010

[13] HM Treasury: Infrastructure Cost Review. December 2010

# 4. Customer Needs

**Key Issues:**

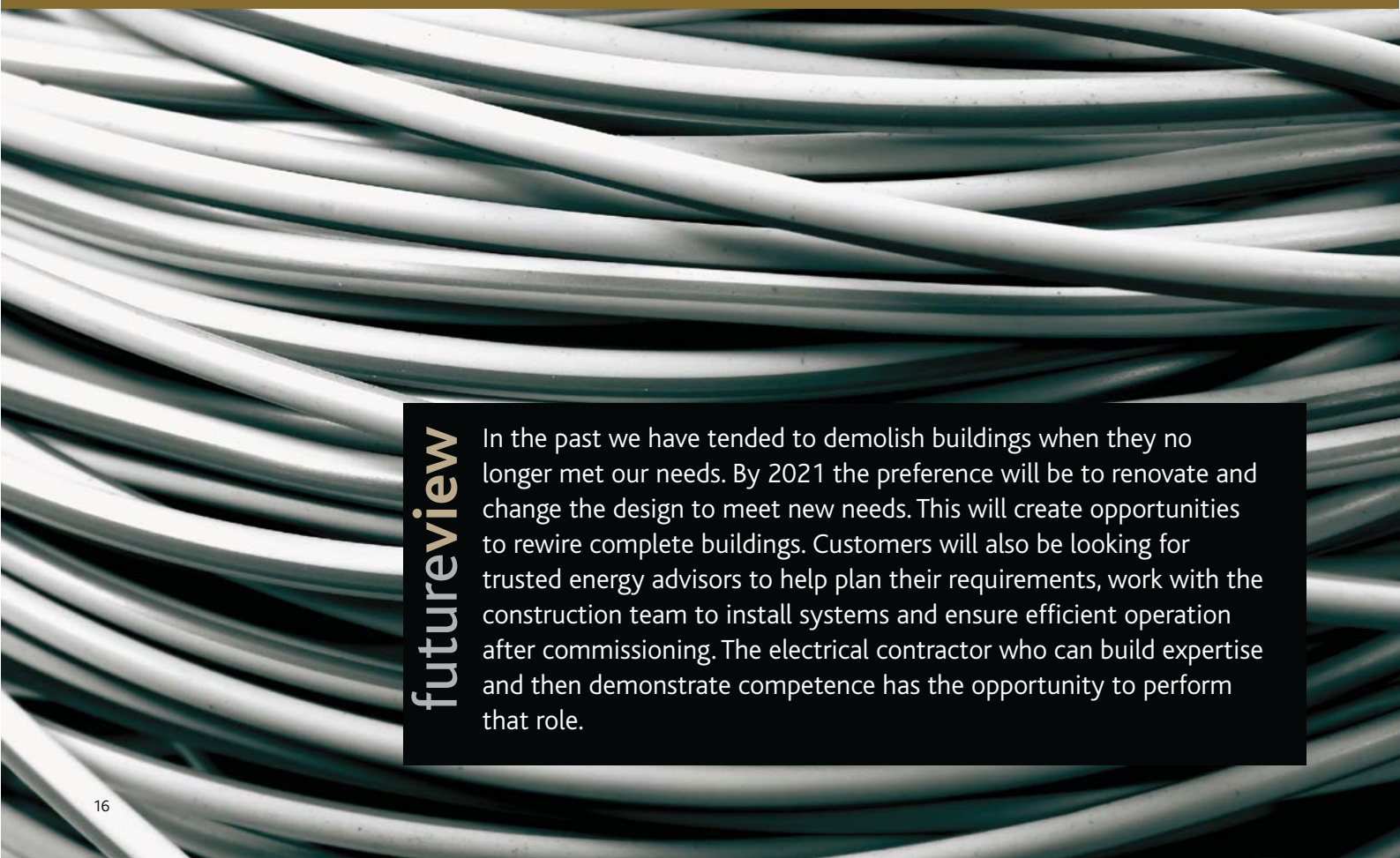
- Confidence in competency of contractors
- Buildings designed to have flexibility to adapt to future circumstances
- Need for upgrading of buildings
- Better asset management
- Streamlined government procurement
- Concern about security of data held, drawn from monitoring equipment usage
- Electrical contracting industry is lacking a good understanding of what its customers want
- Increased home-working

**Opportunities**

- Small and medium sized electrical contractors could refine skills and knowledge of heating and lighting control techniques in order to provide energy efficiency services
- Become Green Deal Assessors
- Become Green Deal or Green Energy installers
- Electrical industry build a reputation for expertise and providing impartial advice

**Threats**

- Failure to take the initiative with the Green Deal could lead to replacement by alternative trades
- Need to keep up to date with new technologies and systems



**futureview**

In the past we have tended to demolish buildings when they no longer met our needs. By 2021 the preference will be to renovate and change the design to meet new needs. This will create opportunities to rewire complete buildings. Customers will also be looking for trusted energy advisors to help plan their requirements, work with the construction team to install systems and ensure efficient operation after commissioning. The electrical contractor who can build expertise and then demonstrate competence has the opportunity to perform that role.

## Building Refurbishment

By 2021 there will have been a change in attitude towards our building stock, with the trend towards reusing existing buildings rather than replacing them. This will be driven by the sustainable agenda, the expediency of quickly meeting demands for buildings and a shortage of skilled labour to deliver buildings. In response to this new buildings will be designed to allow change of use. With this will come a need to change or modify the wiring of systems and networks.

The refurbishment of existing buildings of all types will become an increasingly large aspect of construction. Again with this will come the requirement to renew and change wiring.

The refurbishment of existing buildings of all types will become an increasingly large aspect of construction. This will require changes to the wiring systems.

## Building Energy Management

Building space will also require better management – temperature is currently the biggest cause of complaint in offices and the integration between heat and cooling (opening the window when the heating is on) will become increasingly important for all buildings. To achieve this, better control will be required, most of which will be automated.

Although only 5%[14] of companies currently outsource energy management, this is likely to increase in the future driven by the high price and shortage of energy. This is a logical progression from outsourced property management. Provision of such services may be by those organisations with existing connections to buildings; energy or telecoms suppliers. But it would also be logical for maintenance contractors to provide this service. Part of this will be the provision of training to change behaviour such as temperature control, light switching and less use of major appliances.

## New Working Environments

By 2021 there will be far higher levels of home-working, with a lifestyle balance struck between communication technologies and the need or desire to meet centrally with colleagues.[15] This could lead to a 'café culture' where companies provide social spaces for work colleagues to interact.

## Energy Efficiency

Enthusiasm for take-up of renewable energy by business and homeowners has still to be determined. The construction industry remains sceptical about the viability of such systems but the government is committed and if voluntary take-up is insufficient then legislation will be used to compel.

## Building Assessors

To give people impartial advice and confidence in the selection of renewable technologies, Green Deal Assessors will evaluate homes and provide impartial advice. They will provide an evaluation which the building owner can then take to an accredited installer to undertake the work which will be guaranteed.

## Blurring of Trades

Because of the disruption associated with building renovation, energy efficiency measures will take place at the same time as other renovations, such as an extension. This will see a blurring between accredited Green Deal installers and general contractors. It will also raise standards with the building owner expecting all aspects to be to the same standard with the same levels of guarantee.

[14] Schneider Electric: Future of Energy Management in the UK. July 2010

[15] IGT: 2050 Group Report. October 2010

Buildings of all types will use far more forms of electrically powered devices by 2021, operated by increasingly complex technology.

## Local Power Networks

With the establishment of local power networks there will be a need to install and maintain these services. While this may be controlled by the energy distribution companies, opportunities may exist for sub-contractors to install, maintain or modify the systems.

## Trusted Advisors

Buildings of all types will use far more forms of electrically powered devices by 2021, operated by increasingly complex technology. Building owners and occupants will be looking for someone they trust to advise them on the selection and use of these systems. There is an opportunity for the electrical contractor to be that trusted advisor.

But first it is necessary to correct the poor reputation that the construction industry has with the public. This can be corrected with adoption of accreditation schemes and the reduction of the 'cowboy' contractor.

## What you told us – The NICEIC and ECA survey

*"The main opportunity for our business will be to offer our clients a complete design and build package built around a cost plan with various aspects included such as sustainable materials, energy conservation, Facilities Management and user requirements"*

*"Clients (are) looking for integrated one-stop solutions encompassing power, lighting, telecoms, home automation and entertainment product and services"*

Fig 4.1: Public confidence in competency of contractors – Opportunity


*Source: Online industry research 2011 – see appendix 5*

# 5. Sustainability

**Key Issues:**

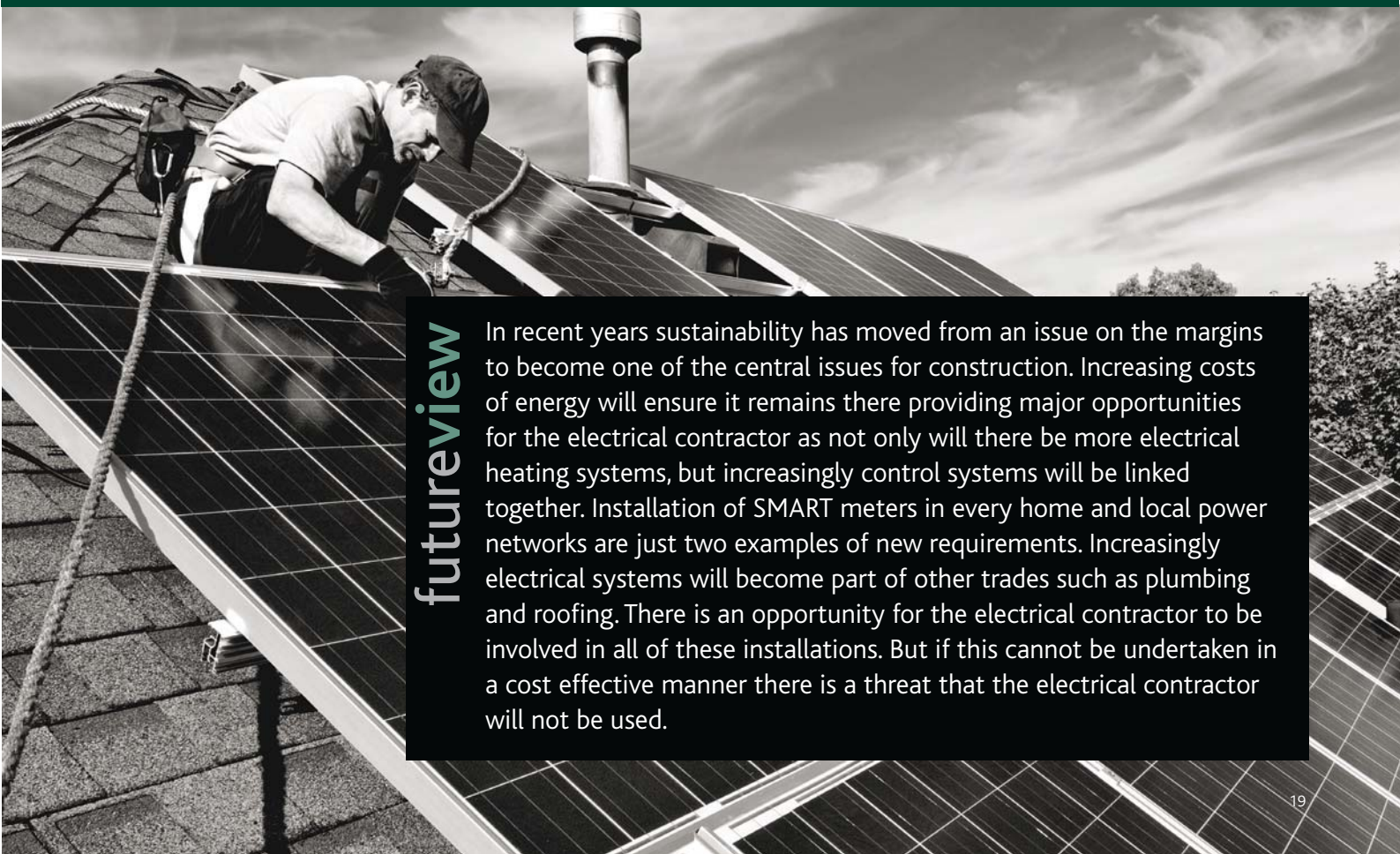
- 15% of UK total energy to come from renewables by 2020
- Green Deal leading to upgrading of 500,000 homes per year
- Upgrading of commercial properties
- All new homes are zero carbon
- All commercial buildings are zero carbon by 2019
- Local renewable energy and power network grids
- Energy security

**Opportunities**

- High demand for electrical and communications installations
- Work required on virtually every building in the UK
- Need for advisors to assess buildings and determine work required
- Need for contractors and installation professionals to fit new systems and components
- Need for professionals to evaluate completed installations

**Threats**

- Failure of the electrical sector to exploit this opportunity will see it replaced by other trades
- Need to keep informed about rapidly changing developments in the installation and use of equipment and systems



**futureview**

In recent years sustainability has moved from an issue on the margins to become one of the central issues for construction. Increasing costs of energy will ensure it remains there providing major opportunities for the electrical contractor as not only will there be more electrical heating systems, but increasingly control systems will be linked together. Installation of SMART meters in every home and local power networks are just two examples of new requirements. Increasingly electrical systems will become part of other trades such as plumbing and roofing. There is an opportunity for the electrical contractor to be involved in all of these installations. But if this cannot be undertaken in a cost effective manner there is a threat that the electrical contractor will not be used.

## Sustainability – a Major Driver

There is no doubt that sustainability will be a major driver in the construction industry in the next 10 years. All three political parties are committed to the sustainable agenda, the only difference is the approach each might adopt. The drive for sustainability is partly about reducing carbon emissions, but also to make the UK more energy efficient in response to increasing prices of oil and shortfalls in UK energy output.

## New Approach to Construction

The challenge for the construction industry is to develop high quality, affordable and buildable technologies while developing the existing skills base to deliver such projects. This will require a restructuring of the industry and close co-operation with the government, clients, supply chain and customers. Potentially this could be very expensive, but the government is looking for new ways to fund this and is expecting cost savings in existing methods of construction. "Ultimately zero or close to zero carbon buildings should be produced for no more cost than those meeting current building regulations".[16]

To reassure and inform homeowners there will be a network of Green Deal advisors who will evaluate a property and present the choices.

## The Green Deal

The Green Deal, which started as a concept of the previous Labour government will be launched in 2012 and is intended to make existing homes and small businesses more energy efficient by giving incentives which will be paid for through savings on their energy bills.

To reassure and inform homeowners, there will be a network of Green Deal advisors who will evaluate a property and present the choices. Each home will need to meet the 'Golden Rule' that the costs of repayment will not exceed the energy savings achieved over a repayment period.

Once the specification for upgrading is determined there will be a network of accredited installers from whom the homeowner can select a company to undertake the work. These companies will be responsible for all aspects including the financing. The government predict that this initiative will create a workforce to fit the energy efficiency measures of 100,000 people by 2017.[17]

Since the introduction of the Green Deal as part of the Energy Bill, placed before Parliament in December 2010, the scope has been broadened from just the upgrading of existing homes to include all types of building upgrades and most recently the cost of introducing low carbon measures to new homes.

## Major Opportunity for Electrical Contractors

While this is a big challenge for the industry, it is also a major opportunity. "In order to transform the built environment, up to 40 years of work for SMEs could be created"[18] of which much could be for electrical contractors and related installation professionals.

## Reforming the Electricity Market

The government intends to reform the electricity market to encourage low carbon generation,[19] ensuring a range of alternatives. 15% of power generation is expected to be from renewable sources by 2020 with a target of 34% reduction in carbon emissions by 2020 and 80% reduction by 2050.[20] These changes, mentioned in previous sections, will provide significant opportunities for the electrical contractor.

[16] HM Government: Low Carbon Construction Innovation and Growth Team, Final Report. November 2010

[17] DECC: The Green Deal a summary of the government's proposals. November 2010

[18] Joey Gardiner: Building. 29 November 2010

[19] HM Treasury/BIS: The Path to Strong, Sustainable and Balanced Growth. November 2010.

[20] HM Government: The Carbon Plan.

SMART meters will communicate with the electricity company to enable multi-tariffs to manage demand and balance loads on the electricity grid.

## SMART Meters

As these initiatives are introduced, measurement and control of consumption will become key for all organisations. This will be helped by SMART meters (see section 2) which will communicate with the electricity company to enable multi-tariffs to manage demand and balance loads on the electricity grid. The meters could help balance load by turning off an entire street/estate's freezers for twenty minutes to counterbalance high loading elsewhere. Electricity storage will also develop with storage vessels in homes, perhaps using electric vehicles as part of this capability.

## Efficiency Strategies

There will also be energy efficiency and security strategies, annual carbon reporting and carbon budgets. Much of this will need to be audited by third parties.

As well as reducing energy consumption the drive to reduce waste will continue, changing the way products and components are packaged and supplied. The small amounts of construction waste that are produced on site will be recycled.

## What you told us – The NICEIC and ECA survey

*"I think the electrical industry will change by the increase of automation within installations, renewable energy is already on the increase at an incredible rate and the changes in lighting will have a major impact on installations and carbon footprint."*

*"Would hope that we gain the level of respect we deserve given the importance that our skills provide in sustainability and carbon reduction."*

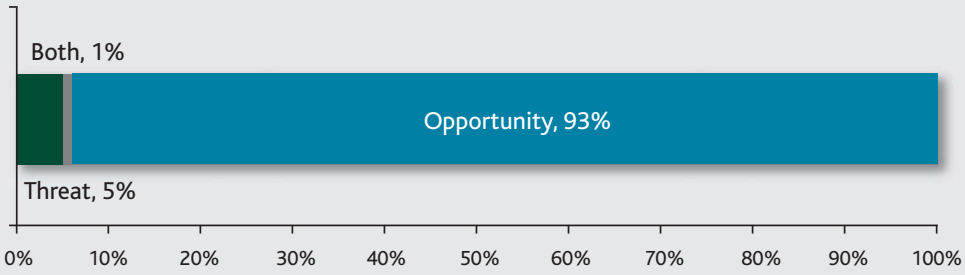
Fig 5.1: Green Deal leading to upgrading 500,000 homes per year – Opportunity


*Source: Online industry research 2011 – see appendix 5*

Fig 5.2: SMART meters in every home – Opportunity


*Source: Online industry research 2011 – see appendix 5*

Fig 5.3: Local renewable energy and power network grids – Opportunity




*Source: Online industry research 2011 – see appendix 5*

The drive for sustainability is partly about reducing carbon emissions, but also to make the UK more energy efficient in response to increasing prices of oil and shortfalls in UK energy output.

Fig 5.4: 15% of UK total energy to come from renewables by 2020 – Opportunity


*Source: Online industry research 2011 – see appendix 5*

# 6. Building Design & Construction

### Key Issues:

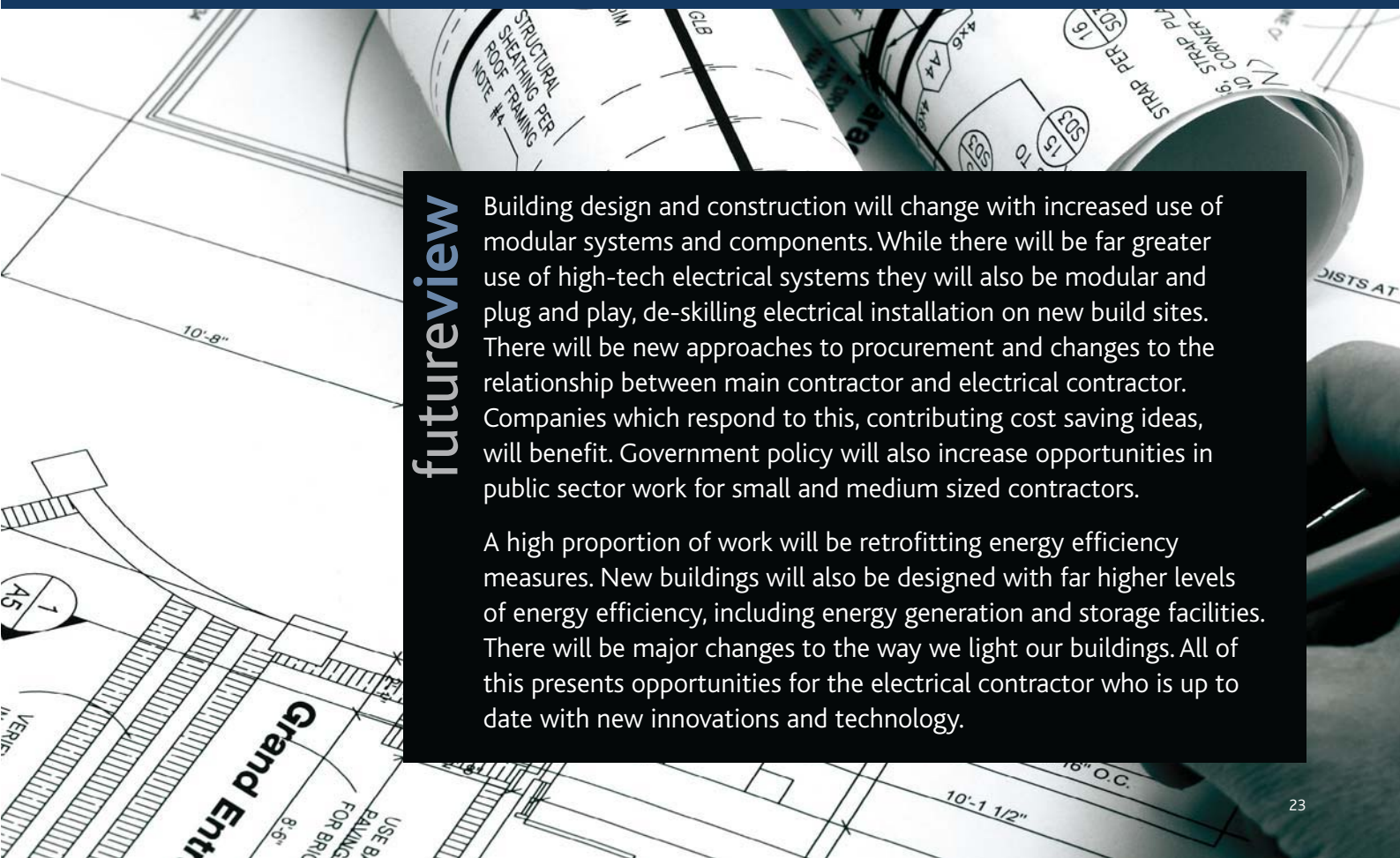
- Increased proportion of single person households
- Less glass boxes, more buildings with greater thermal mass
- Increased re-use of pre 1960s buildings
- Gas in new homes becoming unavailable, water saving and recycling key feature
- 15% of energy generated from renewables, some from local networks
- Move towards 'whole life' costing
- Small building firms move away from new build
- Integrated project teams with early supply chain involvement and greater cost transparency
- Use of electronic communication and stock monitoring systems by supply chain
- More people with project management skills rather than trades
- More components in new build manufactured off-site, reducing amount of skilled craftsmen on site (Modern Methods of Construction)
- More off-site fabrication and "just in time" procurement scheduling
- White goods, flat screen displays and integrated technology are standard "construction" products
- Emphasis on 'the right light, in the right space, at the right time'

### Opportunities

- Far greater use of high-tech electrical systems
- Retrofit of electrical systems to buildings of all types
- Higher demand for broadband in buildings of all types
- Increased home-working with demands for support systems
- Electrical contractor becoming involved earlier in the design process
- Opportunity for electrical contractors to instruct building occupants on how to use their systems
- Government encouraging increased use of small and medium sized contractors on public sector projects

### Threats

- New supply chain relationships
- De-skilling on site



## futureview

Building design and construction will change with increased use of modular systems and components. While there will be far greater use of high-tech electrical systems they will also be modular and plug and play, de-skilling electrical installation on new build sites. There will be new approaches to procurement and changes to the relationship between main contractor and electrical contractor. Companies which respond to this, contributing cost saving ideas, will benefit. Government policy will also increase opportunities in public sector work for small and medium sized contractors.

A high proportion of work will be retrofitting energy efficiency measures. New buildings will also be designed with far higher levels of energy efficiency, including energy generation and storage facilities. There will be major changes to the way we light our buildings. All of this presents opportunities for the electrical contractor who is up to date with new innovations and technology.

There will be a move towards designing buildings based on a clear set of standardised drawings and specifications that will incorporate the latest thinking in design and use.

## Building Design

As has recently been recommended in the review of school procurement,[21] there will be a move towards designing buildings based on a clear set of standardised drawings and specifications that will incorporate the latest thinking in design and use. This will lead to modular construction with more standardised products. This meets the government's objective of providing more energy efficient buildings for people and providing infrastructure which enables a supply of clean, sustainable energy.

## New Main Contractors Relationships

To achieve this, reform of industry structure and practice is required to encourage more collaborative integration of the supply chain (possibly using an industry based accreditation scheme) and address silo-based habits of industry institutions.[22]

## Retrofitting Energy Efficiency

The public will want to improve the energy efficiency of their property and will use government grants to part fund the works. Retrofitted insulation, triple glazed windows, energy efficient boilers and domestic scale renewable energy generators will be considered as the standard for existing stock houses. Feed-In Tariffs will become more popular and SMART meters will become an essential fixture in houses with controls that minimise homeowners 'tinkering' with an optimised system.[23]

## New Homes more Energy Efficient

The future of house building is likely to be driven by the combination of government policy on sustainability, legacy of the economic downturn and fast evolution of innovative technology in the short and medium term. The current policy is markedly focused on the introduction and implementation of the Code for Sustainable Homes and achieving zero carbon homes. This innovative technology is multi-faceted, including off-site production, modern methods of construction, renewable energy, new materials, and ICT.[24] White goods, flat screen displays and integrated technology are also likely to become standard 'construction' products[25] installed at the time of construction.

## New Approach to Offices

By 2021 offices will be changing their appearance, with a move away from the business park where people make long journeys by public transport. Instead there will be workplace constellations, increased home-working and the use of serviced offices where people hot-desk. We will also see the return of workers living nearer to their place of work, and commuting by foot, bike or public transport. Office locations will also be decided by sources of low cost energy from renewable sources.

Buildings will be designed to generate their own energy from solar, wind and ground source heat pumps. Any excess will be supplied to the local community. Glass will remain a major cladding material, but with sophisticated photocromatic properties to control energy gain and loss.

Inside the office, walls of light will replace antiquated lamps and luminaires, to create entire walls and ceilings that bathe rooms in simulated natural sunshine simulating the phases of the day. They will also be able to simulate landscapes and display important messages. Kinetic capture will be used to harvest the energy generated naturally by workers as they go about their daily tasks, including dynamos linked to office chairs and impact capture steps on stairways.

The digital desk will appear in coffee shops, airports and public areas, creating the ability for everyone to work easily on the move and stay connected to the office and the world. This will mean that people will no longer need to carry around laptops. Instead they will have a desk comprising millions of low energy LEDs hidden behind a protective surface. Keyboards will be built into a textured area of the desktop surface, with the user simply moving their hand to control the cursor. Files will be saved instantly on central servers and users will be able to personalise areas of their desktop with electronic sticky notes, family photos, e-birthday cards and personal messages.[26]

## Supply Chain

While there are some good procurement practices, principally amongst the larger clients and property developers, there are also many poor practices, particularly in the public sector. There will be a move towards a more integrated approach with designer and contractor working together in full collaboration using tools such as BIM (Building Information Modelling). This should lead to the

[21] Sebastian James: Review of Education Capital. April 2011

[22] HM Government: Low Carbon Construction Innovation and Growth Team, Final Report. November 2010

[23] IGT: 2050 Group Final Report. October 2010

[24] Goodier & Pan: The Future of UK Housebuilding. December 2010

[25] CPA: Long term prospects for the UK new housing market. March 2008

[26] E.ON: The Office of the Future. September 2008

elimination of wasteful processes in procurement.[27] Moves towards integrated project teams will mean that architects and engineers will need to talk to each other more and there will be early involvement of the electrical contractor advising the design team. A further development will be the need to 'train' building occupants in how to use their building.

## Localism good news for SMEs

As part of its Localism government also wants to see more locally based SMEs involved in construction of government projects providing opportunities for electrical contractors and related installation professionals.[28] However as a counter to this new market, players such as the large retailers and energy providers, are likely to enter the market via the Green Deal in the refurbishment market.

Use of modular construction techniques can be expected to develop, from the re-use of sea containers to construction of specialist pods.

## Modular Construction

Use of modular construction techniques can be expected to develop, from the re-use of sea containers to construction of specialist pods. All of these will see a transfer of electrical skills to the factory from the construction site where it will be increasingly a matter of plugging modules together.

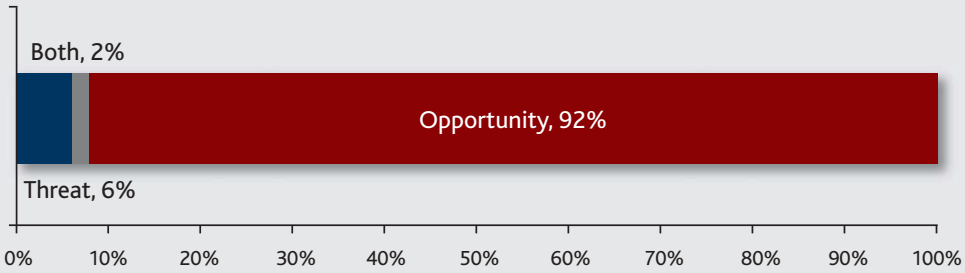
### What you told us – The NICEIC and ECA survey

*"Building technologies will remove the need for fixed wiring as modular assemblies become the industry standard, I also see domestic microprocessor power usage control becoming more common."*

*"We currently carry out a lot of void property tests, which is the bulk of our business for housing associations, from a future point of view I can see almost all these properties having to replace the cabling and all accessories, which would be a massive project."*

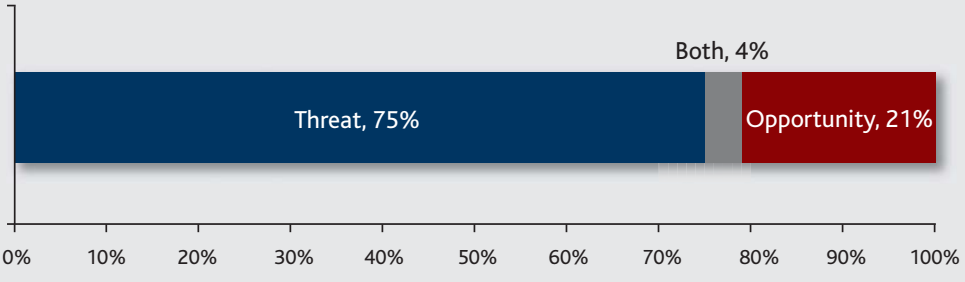
*"More wireless technology, prefabrication will be paramount for major installations."*

Fig 6.1: Intelligent buildings with integrating control systems – Opportunity




*Source: Online industry research 2011 – see appendix 5*

Fig 6.2: More components in new build manufactured off-site, reducing amount of skilled craftsmen on site – Threat




*Source: Online industry research 2011 – see appendix 5*

[27] Paul Morrell, Chief Construction Advisor: CIMCIG debate. January 2011

[28] CPA: Improving Construction Logistics. August 2005

# 7. Product Developments

**Key Issues:**

- New products to enable sustainable new build and renovation of existing properties
- Systems integration – ICT based intelligent buildings
- Wireless technology
- SMART meters in every home
- Local power networks communicate to provide power flexibly
- New ways to connect renewable generation to distribution networks
- Material shortages and high prices (copper, plastics, rare earth metals) – alternatives developed

**Opportunities**

- An expanding network of sources of energy connected to the building's power network
- Increasingly sophisticated appliances and control systems will require high levels of expertise when they fail

**Threats**

- Development of plug and play and de-skilling will mean that other trades can do electrical installation
- Must understand different technologies
- Less cable, less installation work

futureview

There will be a raft of new product developments in response to the need for energy efficiency in buildings, but also because changes to components used as commodities such as copper are becoming increasingly expensive.

Most buildings will be generating some of their own power, as well as providing charging points for equipment ranging from portable entertainments to electric cars. Cabling in buildings will have simplified, reducing the amount and complexity of work for electrical contractors. The approach to lighting will have also changed, with more 'designed' solutions often simulating daylight. The internet will run at far greater speeds than today and will connect to many domestic appliances as part of their energy management systems. This will provide upgrading opportunities in existing buildings.

## Power Generation

By 2021 new ways to connect renewable generation to distribution networks will have been developed which maximise the capacity of renewable generation supplied into the network. We will see smarter grids with new tariffs, monitoring energy use, and responding more flexibly.[29]

Power generation will also have evolved. In addition to current renewable technologies of solar, wind and biomass we can expect to see anaerobic digestion where waste material is converted into biogas, enabling both a reduction in waste and production of a greener fuel.

Increasingly photovoltaic façades will be used to generate energy and layers of piezoelectric material will form the floor, with each contact generating a small amount of energy that will be used to power low voltage devices such as sensors and LED displays.[30]

As well as requiring charging points in homes and public areas, electrical vehicles could also provide a way to store energy and feed back into the system when required.

## Energy Control

SMART meters should drive consumer awareness of the running costs for their house, potentially generating more demand for energy efficient dwellings and appliances.

Office buildings will have SMART networks built into their fabric or use wireless technology to share information. These will learn how a building's inhabitants work, monitoring and adjusting energy usage to cut wastage and create a more comfortable, productive workplace. This could go so far as the identification of individuals and the learning of their habits so that equipment and lights can be turned on and off to suit.

More plug and play units will be used for all aspects of electrical components, reducing the skills required to install and connect.

Principal lighting technology issues are the improvement of solar power lighting to make energy conversion more efficient, storage of renewably sourced energy and smarter systems in buildings.

## Lighting and Photovoltaics

Principal lighting technology issues are the improvement of solar power lighting to make energy conversion more efficient, storage of renewably sourced energy and smarter systems in buildings.

The main focus will be the efficiency of light sources. Effective control will mean movement sensors rather than switches will be used. The integration of daylight with artificial light will also be achieved. There will be emphasis on 'the right light, in the right space, at the right time'.

Standardisation of LED modules will make them interchangeable and more easily replaceable, opening up the marketplace for competition and innovation.

Daylight harvesting, where photovoltaics store energy collected during the day and use this to power lights, rather than being used to feed into the grid could develop. This would remove the need for wires and cables. Stand-alone solar powered street lights will also start to become available.

Electroluminescent (EL) paint containing millions of microscopic phosphors will allow office walls and ceilings to be bathed with simulated natural light, using a fraction of the energy. The colour could be adjusted to simulate natural daylight changes, with 'the sun' passing across a cloudscape through the workplace from east to west in real time during the day.

[29] LCN Fund: Creating Britain's low carbon future today. 2010

[30] E.ON: The Office of the Future. September 2008

Demand for copper and steel is set to double, largely due to increasing needs from China and India, however supply will not increase significantly. As prices are driven up alternatives will be developed.

## Cables

Demand for copper and steel is set to double, largely due to increasing needs from China and India, however supply will not increase significantly. As prices are driven up alternatives will be developed.

Utility companies have already started to address this problem by using aluminium. However it is not suitable for use by itself. Copper clad aluminium is a possible solution, but there is some risk of bi-metallic corrosion making external applications difficult.

Cable usage will thus change. Design changes will allow cable ratings to increase, allowing smaller cables for higher voltages. There may be the replacement of the ring main with radial networks using smaller cables to supply a group of sockets. Ducted cables running behind skirting boards will allow surface mounting, and bus bars will be used within buildings. This will also help to meet air tightness requirements of sustainability standards by reducing the need to knock random holes in walls to install cables.

With more off-site manufacturing and testing to make on site installation quicker we will also see increased use of prefabricated cable and plug systems that require less installation skills.

## Communications

It is estimated that the internet industry is worth £100 billion in the UK. The Photonics HyperHighway project aims to upgrade internet hardware, introducing new materials and devices to increase internet bandwidth to support the 80% pa growth of the global communication infrastructure.[31]

## Appliances

From 2016, it is expected that the majority of emissions generated from a new house will be from appliances, with space and water heating contributing less to the burden. Devices to measure consumption, and turn off items when not in use, will be increasingly used.

The expanding array of portable powered appliances for entertainment and leisure will require easy to use charging points around the home and office. Alternatively, a network of Ethernet cables will be used to deliver 12 volt supply to appliances, possibly drawing power from photovoltaics.

### What you told us – The NICEIC and ECA survey

*"It is too fragmented across the supply chain to act in a sufficiently co-ordinated way."*

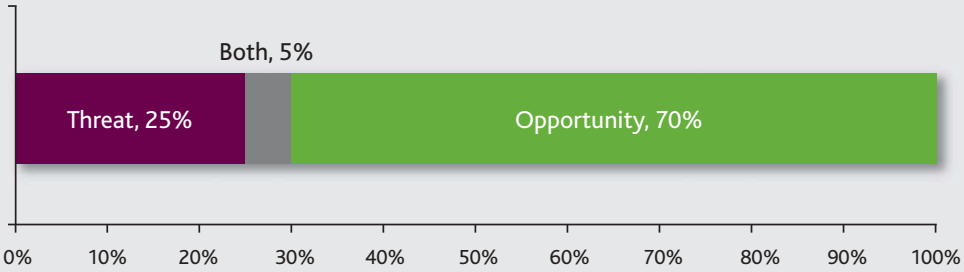
*"Electrical installations are in the main a low interest product. Many of the situations which necessitate work are distress ones, resulting in low cost fixes. Look at the TV/press advertising now being conducted by some of the gas boiler manufacturers. Our industry needs to promote itself."*

[31] BIS: Pioneering research could make the internet 100 times faster. January 2011

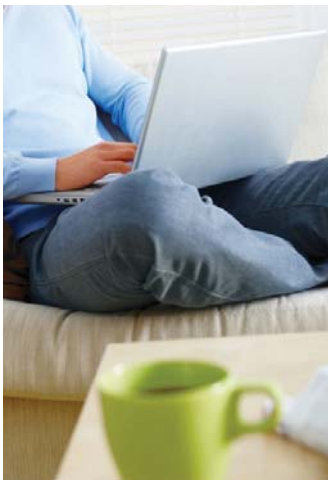
Fig 7.1: New products to enable sustainable new build and renovation of existing properties – Opportunity


*Source: Online industry research 2011 – see appendix 5*

Fig 7.2: Greater use of wireless technology – Opportunity




*Source: Online industry research 2011 – see appendix 5*



The increased use of portable appliances will create a need for more plug sockets around the house.

# 8. Industry Skills

**Key Issues:**

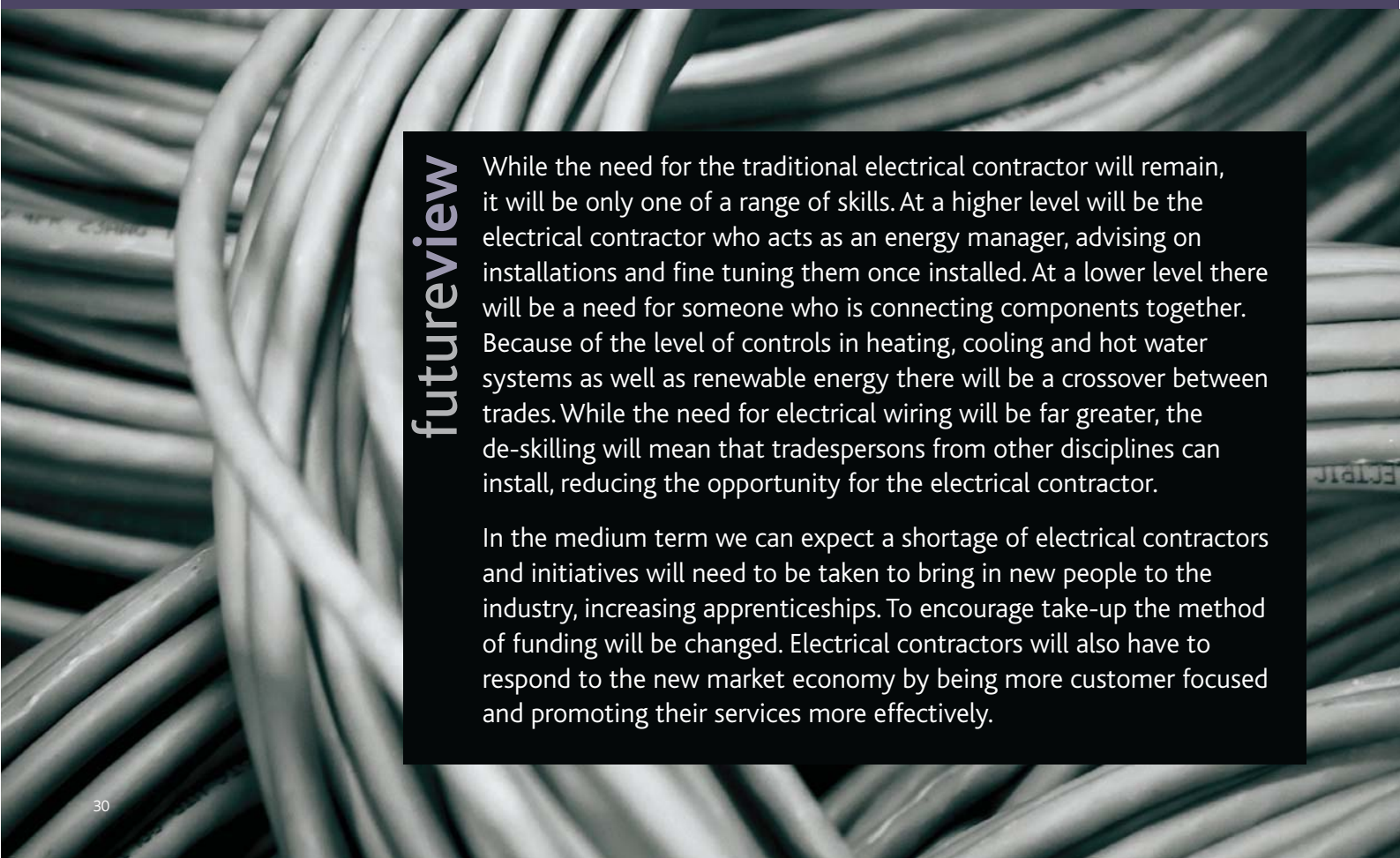
- New skills for installation and maintenance of new technology such as solar panels, heat pumps and district heating systems
- Computer literate multi-skilled workers who understand how differing trades must fit together. New National Occupational Standards to reflect this
- Broader range of training providers to increase quality levels. More training delivered by SMEs via the work-place particularly with new technology and skills
- Funding via Further Education Loans and Lifelong Learning Accounts
- More apprenticeships, with sub-contracted apprentice management
- Engineer, electrician & plumber not protected names in the same way as architect
- European skill level – higher than in UK
- Ageing workforce at supervisory and professional level

**Opportunities**

- Provide energy advisory services
- Demand for electricians exceeds supply
- Involvement in other trades
- Problem solving role growing
- Government investment in apprenticeships

**Threats**

- Merging of trades
- Electrical contractor will need new skills
- De-skilling on site
- Shortage of electrical contractors
- European tradespersons working in the UK



**futureview**

While the need for the traditional electrical contractor will remain, it will be only one of a range of skills. At a higher level will be the electrical contractor who acts as an energy manager, advising on installations and fine tuning them once installed. At a lower level there will be a need for someone who is connecting components together. Because of the level of controls in heating, cooling and hot water systems as well as renewable energy there will be a crossover between trades. While the need for electrical wiring will be far greater, the de-skilling will mean that tradespersons from other disciplines can install, reducing the opportunity for the electrical contractor.

In the medium term we can expect a shortage of electrical contractors and initiatives will need to be taken to bring in new people to the industry, increasing apprenticeships. To encourage take-up the method of funding will be changed. Electrical contractors will also have to respond to the new market economy by being more customer focused and promoting their services more effectively.

## New Skills from the Electrical Contractor

The increasing use of SMART meters and systems, the energy management of appliances and the use of renewable energy will change the design of future buildings, and what is required from the electrical contractor.

The need for the traditional electrician with the ability to install and maintain on site cabling and electrical equipment will never entirely go away. But the role will change.

There will still be a requirement for an electrical contractor, much as we know them today, with the same core skills, however he/she will require a greater knowledge and understanding of other trades.

Upgrading of existing buildings will see the need for new skills relating to the installation of new technology such as solar panels, heat pumps and district heating systems. But there will also be the need to change existing systems to lower energy consumption and cost of operation.

## Threat from other Trades

Opinions are split concerning the emergence of multi-skilled operatives that can fit new systems such as solar panels involving roofing, plumbing and electrical work. Each skill requires specific training and it has been argued that an electrician will not complete roofing work as well as a roofer and vice versa. However if the electrician does not occupy this ground, others might. The Federation of Master Builders is already proposing new National Occupational Standards for multi-skilled workers who understand how differing trades must fit together.[32]

For new build, more components will be manufactured off-site, reducing the need for skilled craftsmen on site. While in the factory it will be an assembly role.

## Different Skill Levels for the Electrical Contractor

These changes mean that in future the role of the electrical contractor will split into several bands. At the top will be the energy advisor with the ability to help clients minimise the whole life costs of running their building. Project management skills will be important.[33] It will be a systems based approach, with an understanding of how to control power and data with an emphasis on commissioning and integration. They will probably be responsible for fine tuning over the first few years of a system's life in order that energy efficiency and costs can be optimised. Skills required won't be traditional core skills, but an understanding of commissioning procedures and maintenance. Their skills will be intellectual rather than physical, not so much knowing the answer, but knowing where to go to get the answer. They will need to understand the sustainable implications of products, their lifetime cost as well as technical installation aspects.

There will still be a requirement for an electrical contractor, much as we know them today, with the same core skills, however he/she will require a greater knowledge and understanding of other trades. Much of their work will be in existing buildings, upgrading and problem solving.

Also working on site will be a lower skilled installer. Legislation is already de-skilling the role of the electrical contractor and the plug and play nature of future components will take this further. His/her role will be the connecting together of systems and components.

## Shortage of Electrical Contractors

As was indicated from our survey, recession means that people take early retirement or move out of the industry. As the UK recovers from the recession, the industry will encounter a dip in existing skill levels and availability at a time when new low carbon technology is also growing and demanding that new skills are acquired.

During the early part of this century the UK's skills shortage was overcome by using European labour. Because UK electrical systems are different to European systems the use of foreign electricians was discouraged as it could lead to problems unless closely supervised to ensure that UK wiring systems

[32] FMB: Building a Greener Britain. July 2008

[33] NHBC/Zero Carbon Hub/Construction Skills: Home Building Skills 2020.

were being adhered to following instances of European electricians wiring to European standards rather than UK standards. All European standards, including BS 7671, are merging which will make it easier for European electricians to work in the UK in future.

## Apprenticeships

Skills shortage will thus be an issue, both in terms of bringing new people into the industry and to train current electrical contractors in the new technology being introduced.

The government has recognised this as an issue and will co-fund courses that will specifically meet the skills needs arising from the transition to the low carbon economy.[34] More emphasis will be put on apprenticeships with the cost of training shared between employers, individuals and state with the introduction of Further Education Loans and Lifelong Learning Accounts for adult learners.

Small and medium sized companies will increase the number of courses provided through the workplace while the larger the company, the more likely it is to sub-contract apprentice management.[35]

As a result apprenticeships will continue as a good way of training, combining theoretical knowledge with practical application, with an emphasis on understanding both design and practical applications of new technology.

## Customer Focus

In the increasingly competitive market, with a focus on post-occupancy evaluation, the electrical contractor will need to become more customer focused.

In the increasingly competitive market, with a focus on post-occupancy evaluation, the electrical contractor will need to become more customer focused. This means being aware of what his/her customer wants from them. The construction industry changes, offering new services such as energy advisor and ensuring that all projects are completed to a satisfactory standard. The development of social media such as Facebook and Twitter mean that it will be increasingly easy for potential customers, both industry and residential, to gather and share experiences about electrical contractors. It will be important to use this to your advantage.

### What you told us – The NICEIC and ECA survey

*"With increasing new technology and energy saving devices being developed every day the likelihood of the normal electrician being required will be less. There are more unskilled operatives saying they are Part P approved which often gives the buyer/client a false view or their qualifications but this does not necessarily make them (the Part P approved operative) less competent. I believe that the days are somewhat numbered of the qualified electrician as he/she is today."*

*"There will be less skilled workers and engineers, and/or the standard of skills will be reduced from present levels. The maintenance of standards of electrical safety, and installation quality will drop, as there will not be enough engineers available to maintain current standards."*

*"Traditional firms will struggle unless they adapt and change the range of services they offer."*

*"There will be installers, people to connect and people to test and commission, these will be three separate jobs."*

[34] BIS: Skills for Sustainable Growth. November 2010

[35] JTL, ECA Member Companies' Apprentice Training Practices. November 2010

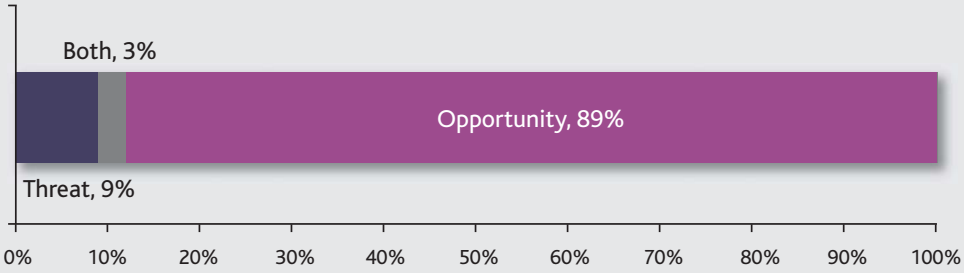
Fig 8.1: More training for small businesses in new technology and skills – Opportunity


*Source: Online industry research 2011 – see appendix 5*

Fig 8.2: More apprenticeships – Opportunity

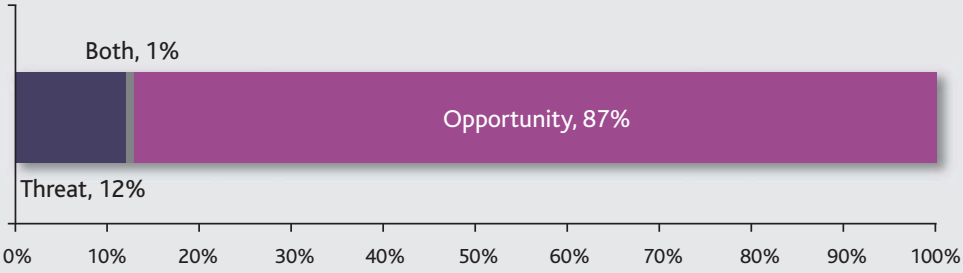

*Source: Online industry research 2011 – see appendix 5*

Fig 8.3: New skills required for installation and maintenance of new technology – Opportunity




*Source: Online industry research 2011 – see appendix 5*

Fig 8.4: Funding for training via Further Education Loans – Opportunity

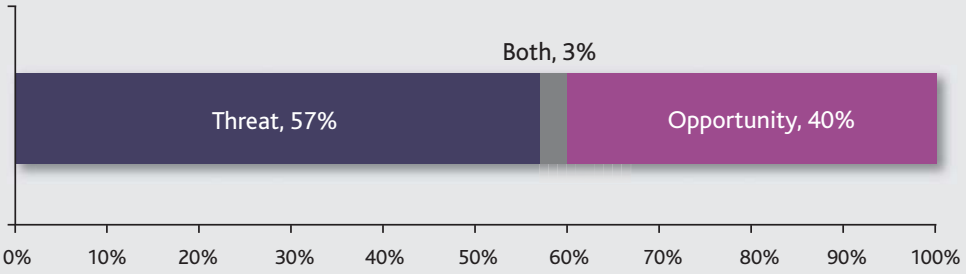



*Source: Online industry research 2011 – see appendix 5*

Fig 8.5: Computer literate multi-skilled workers who understand how differing trades must fit together – Opportunity

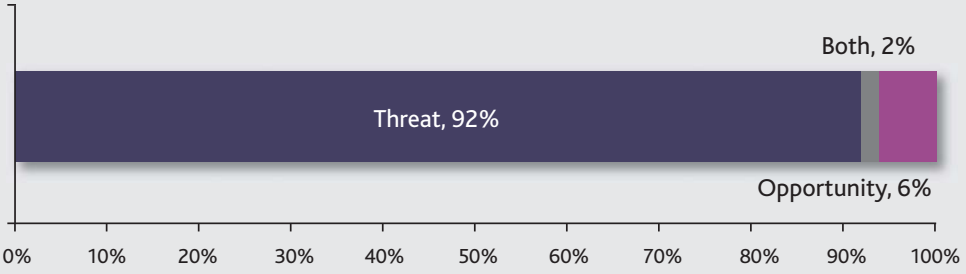

*Source: Online industry research 2011 – see appendix 5*

Fig 8.6: Crossover of trades requiring multi-skilling – Threat




*Source: Online industry research 2011 – see appendix 5*

Fig 8.7: Lower skilled workforce doing work currently done by tradesperson – Threat




*Source: Online industry research 2011 – see appendix 5*

Apprenticeships will continue as a good way of training, combining theoretical knowledge with practical application, with an emphasis on understanding both design and practical applications of new technology.

# Appendix 1: Authors

## Chris Ashworth

Chris Ashworth is a Fellow of the Chartered Institute of Marketing and works as a marketing and sales consultant. He has over thirty years experience in the construction industry working with blue chip companies.

In 1999, he founded Competitive Advantage, a marketing consultancy, implementing strategy, undertaking research projects and providing sales and marketing training in a construction industry context. Clients from the electrical sector include Prysmian Cables, Voltimum and Schneider Electric.

Chris runs a series of training programmes in collaboration with The Building Centre on marketing and sales issues, is an Associate Lecturer at Oxford Brookes University and a committee member for the Chartered Institute of Marketing Construction Industry Group (CIMCIG). He is also a regular contributor to a number of industry publications.

Prior to this he was Director of Marketing at Saint-Gobain Glass UK. He developed and led a programme which took the company out of commodity products into added value, establishing leadership in a number of niche markets.

He has also worked for Cape, a manufacturer of high performance building boards, where he held a number of senior sales and marketing positions including Head of Marketing, UK National Sales Manager and General Manager of their Asian business.

He started his career with the specialist fire division of Chubb travelling overseas, principally to Saudi Arabia and the Gulf states.

## Bill Wright

Bill Wright is an independent consultant on energy and sustainability matters. He is immediate past Chairman of the Electrical Safety Council and was a Director of SummitSkills, the sector skills council associated with Building Services Engineering, from 2003 to 2010. He is a member of the Institution of Electrical Engineers' committee which produces the IEE Wiring Regulations and is also a part time lecturer on energy matters at London South Bank University.

He was previously the Corporate Energy and Environment Manager of the John Lewis Partnership, covering both Waitrose supermarkets and John Lewis Department stores. He was responsible for the procurement and efficient use of all utilities, with a budget of over £40m, and was involved in the planning, building and engineering design to ensure new buildings and refurbishments incorporated sustainability in their construction. Prior to this he was Chief Electrical Engineer for the group for over 10 years after joining Waitrose as Engineering Manager.

His early career was spent with the MoD at various research establishments including the National Gas Turbine Establishment where he was Head of Test Services Section. He has an MA in engineering from Trinity Hall, Cambridge and is a Chartered Engineer and Fellow of the IET.

## Emma Townend

Emma Townend, who is a Chartered Engineer and Member of the Institution of Civil Engineers, spent 17 years working on construction sites both in the UK and overseas for main contractors. She started as a site engineer progressing through to positions as site manager to contracts manager, her most recent project being the New Tyne Crossing with Bouygues Travaux Publics. Since 2009 she has been working as a trainer and consultant in health and safety. In addition to working on projects for Competitive Advantage, she is a lecturer at Gloucester College on their HNC Civil Engineering programme.

# Appendix 2: Contributors to the report

The authors would like to thank the 1000 participants in the NICEIC and ECA survey and the following for sharing their opinions while researching this report.

| | |
|---|---|
| James Allen | Schneider Electric |
| Eric Anderson | Siemens |
| Cal Bailey | NG Bailey |
| Alan Clarke | Heatrae Sadia Heating |
| Mat Colmer | Energy Saving Trust |
| Hywel Davies | CIBSE |
| Giuliano Digilio | ECA |
| Andrew Eastwell | BSRIA |
| Angus Falconer | Edmundson Electrical |
| Tom France | Schneider Electric |
| Noble Francis | Construction Products Association |
| Doug Gracias | Prysmian Cables & Systems Ltd |
| Stewart Gregory | Schneider Electric |
| Stefan Hay | ECA |
| Dennis Hird | JTL |
| Diane Johnson | Eric Johnson of Northwich Ltd |
| Stewart Langdown | Tridonic |
| David Latimer | JPEL 64 and Fisuel |
| Ian MacDonald | ECA |
| Jenny MacDonnell | British Council for Offices |
| Jonathan Madden | Heatrae Sadia Heating |
| Keith Marshall | SummitSkills Ltd |
| Jim O'Neill | Shepherds |
| Richard Pagett | Ascertiva Group Limited |
| Rod Pettigrew | HVCA |
| Howard Porter | BEAMA |
| Paul Reeve | ECA |
| Louise Smith | Schneider Electric |
| Russell Solts | Smart Electrical and Data Ltd |
| Jane Thornback | Construction Products Association |
| Steve Walker | Walker Electrical Services (UK) Ltd |
| Richard Walley | Schneider Electric |
| Alan Wells | NICEIC |
| Allan Wilén | Glenigan |

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# Appendix 4: Legislative Timeline

| | |
|---|---|
| 2011 | • Start of formal consultation on Green Deal legislation.<br>• Launch of the Renewable Heat Incentive.<br>• Accreditation of Green Deal installers and Assessors starts. |
| 2012 | • Launch of the Green Deal.<br>• Green Investment Bank operational.<br>• First carbon allowance sale for the Carbon Reduction Commitment.<br>• 50% reduction of construction, demolition and excavation waste to landfill compared to 2005.<br>• 15% reduction in carbon emissions from construction processes and associated transport compared to 2008 levels.<br>• 25% of products used in construction projects to be from schemes recognised for responsible sourcing.<br>• Water usage in the manufacturing and construction phase reduced by 20% compared to 2008 usage.<br>• All construction projects in excess of £1 million to have biodiversity surveys carried out and necessary actions instigated. |
| 2013 | • All private sector new homes to be built to Level 3 Code for Sustainable Homes.<br>• All public sector new homes to be built to Level 4 Code for Sustainable Homes.<br>• Building Regulations 2013, Part L. |
| 2014 | • National roll-out of SMART meters starts to 30 million homes. |
| 2015 | |
| 2016 | • All new homes to be built to zero carbon standards.<br>• Building Regulations 2016, Part L.<br>• Building Regulations 2016, Part J. |
| 2017 | |
| 2018 | |
| 2019 | • All new non-domestic buildings to be built to zero carbon standards.<br>• Building Regulations 2019, Part P.<br>• Building Regulations 2019, Part L.<br>• Publication of the 18th Edition of Wiring Regulations. |
| 2020 | • SMART energy management meter in every home.<br>• 15% of UK total energy to come from renewables by 2020. |

# Appendix 5: Electrical Contractor and related Installation Professionals' Views

An online survey was completed in March 2011 by electrical contractors and related installation professionals who are members of the ECA or clients of NICEIC. A total of 966 responses were completed by representatives of companies from a range of sizes, mostly (73%) employing between 1 and 7 people. Respondents' organisations had been active in the industry for an average of 19 years.

When asked how they thought the electrical industry would be different in 10 years time the largest trend anticipated was a move towards more renewable energy (19.5%) with increased use of energy saving products and installations (13.6%) and new technologies including SMART (Self Monitoring, Analysis & Reporting Technology) systems and intelligent building systems (12.9%). There was also an expectation of more legislation and regulation (15.9%) which was seen as both good and bad.

The main unprompted opportunities were seen as driven by renewable technology (19.8%), in particular solar (13.5%) and other energy saving products and installations (13.0%). New technology was seen as an opportunity by 9.1%.

When asked to comment on a series of factors the biggest opportunities identified were more training for small businesses in new technology and skills, new products becoming available to enable sustainable new build and renovation which would respond to demand from the Green Deal leading to upgrading of 500,000 homes per year.

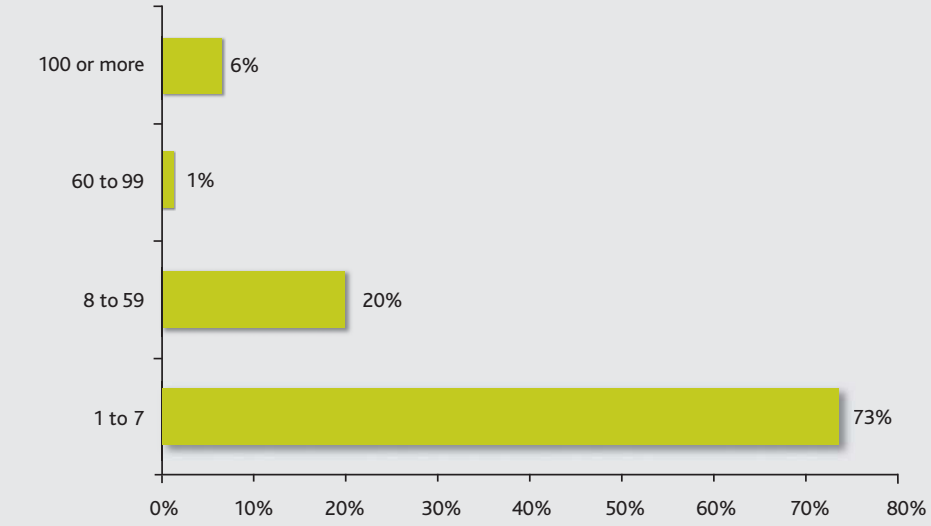
The biggest unprompted threat identified was a lack of regulation leading to less qualified or even untrained electricians (34.1%) working in the industry, this included the 'short course' electrician. The recession and difficult economic climate (8.7%) were also seen as threats, as was aggressive competition (12.0%) within the industry.

The biggest threat identified from a list of factors was a lower skilled workforce doing the work currently done by a tradesperson. The trend for more components in new build manufactured off-site, reducing the amount of skilled craftsmen on site was also seen as a significant threat.

The principal barrier to change in the industry was linked to legislation and regulation (19.7%) including problems with Part P, paperwork and bureaucracy. Lack of regulation (17.2%) was also seen as a threat as this would allow more untrained people to work as electricians.

# Additional figures and tables

## Fig A4.1: Number of employees in your organisation




## Fig A4.2 Number of years your organisation has been active in the industry

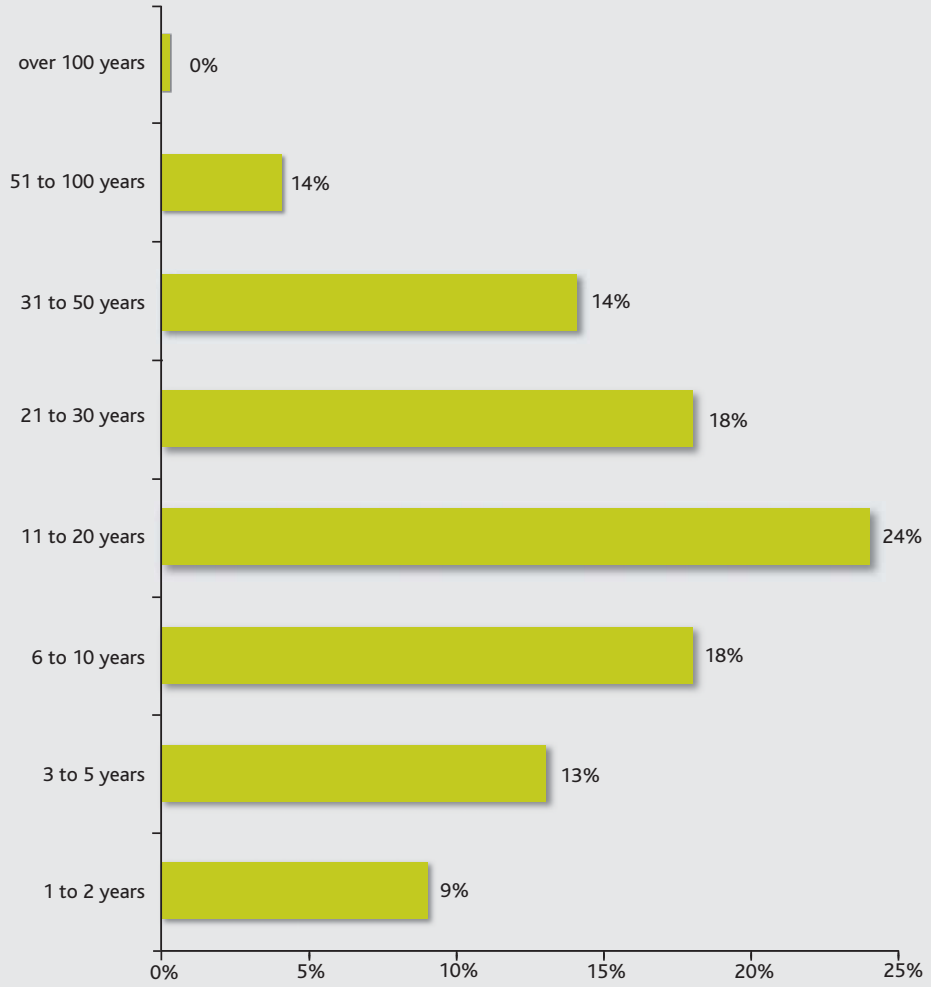
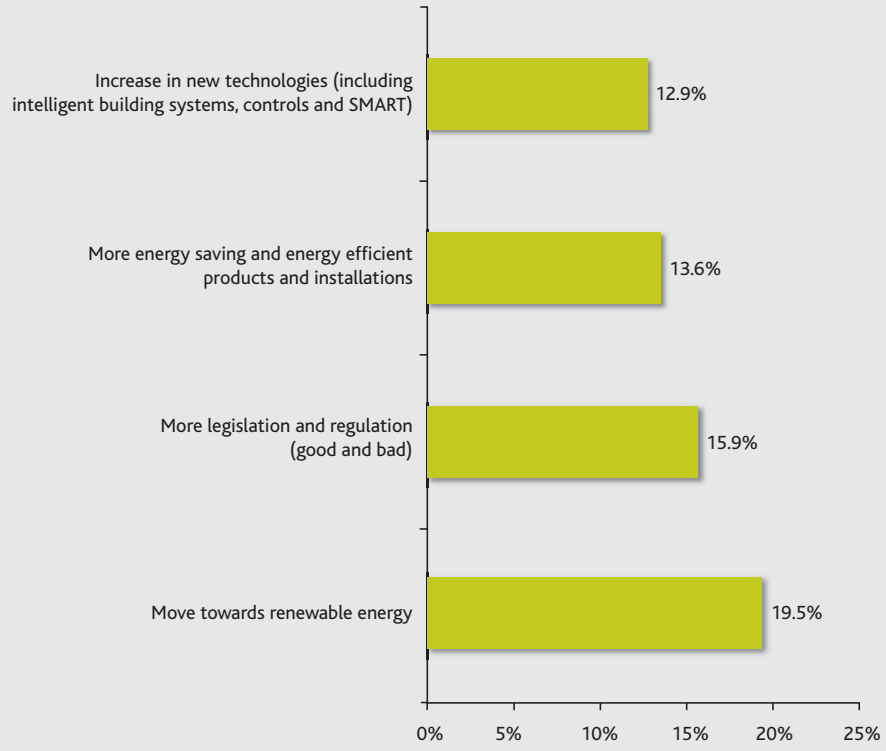


Fig A4.3: How do you think the electrical industry will be different in 10 years time – top responses, unprompted

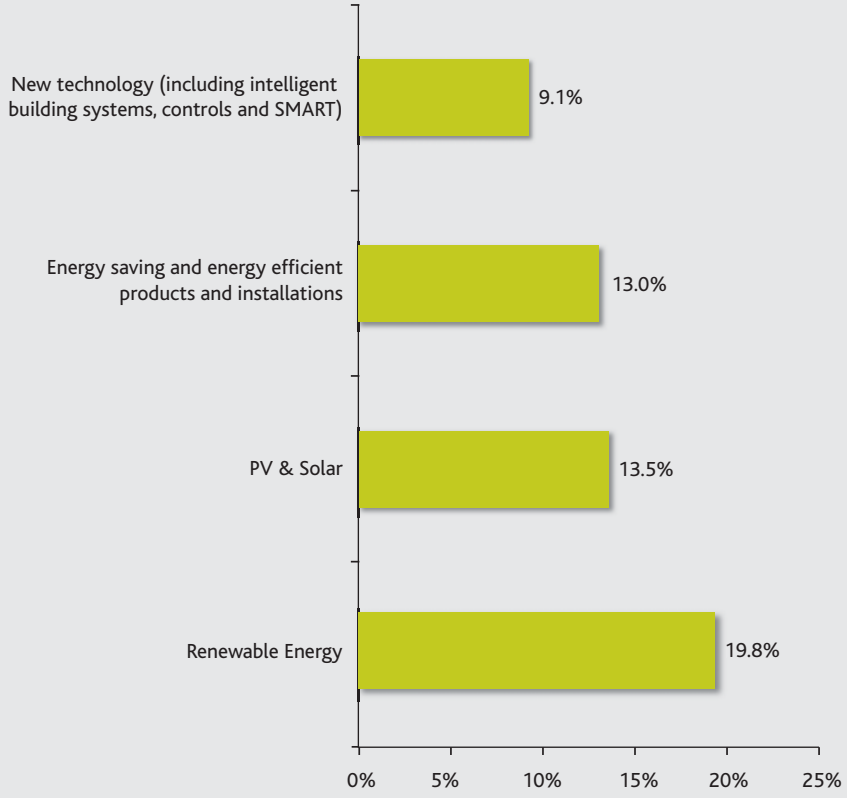


## Table A4.4: How do you think the electrical industry will be different in 10 years time – all responses, unprompted

| | |
|---|---|
| Move towards renewable energy | 19.5% |
| More legislation and regulation (good and bad) | 15.9% |
| More energy saving and energy efficient products and installations | 13.6% |
| Increase in new technologies (including intelligent building systems, controls and SMART) | 12.9% |
| Sole traders and SMEs will be fewer/disappear | 4.4% |
| Lower level of skill will be required to install new technologies | 4.2% |
| Move towards wireless installations | 3.5% |
| Skills shortage will cause problems | 3.3% |
| More problems with unregulated, unqualified companies, foreign labour and DIYers | 3.1% |
| More micro-generation projects on both industrial, domestic and community level | 3.1% |
| Industry will become more competitive | 3.0% |
| More plug and play and modular installations | 2.5% |
| More inspection and testing required | 2.5% |
| Less trainees and apprenticeships | 2.5% |
| More widespread installation of low energy lighting/LEDs | 2.5% |
| Electricians will specialise more | 2.0% |
| More smaller companies/contract workers will enter the workplace | 1.9% |
| Electricians will diversify into different areas (mainly mechanical) | 1.5% |
| Finances will become tighter and margins smaller | 1.3% |
| Electrical heating will take over from gas | 1.2% |
| Death of the ring main, rise of RCBOs, surge protection | 0.9% |
| Quality standards will fall | 0.8% |
| Minimum training and qualification requirements will increase | 0.8% |
| Safety requirements will increase as will use of safety devices | 0.8% |
| No meaningful future/industry will decline | 0.7% |
| Electricians will have problems keeping up with technology changes | 0.7% |
| Increase in number of domestic electricians | 0.7% |
| Consumer knowledge and awareness of products, services and standards will increase | 0.6% |
| Better margins, stronger industry | 0.6% |
| Disruption to energy supplies | 0.4% |
| Retrofit market will increase | 0.4% |
| Tighter programmes | 0.4% |
| More sub-contractors | 0.4% |
| Battery power will be in more common use | 0.4% |
| Fault finding, maintenance and repair will be bigger | 0.4% |
| Costs will continue to increase | 0.4% |
| Contractors will move into design and build, specifying to the client rather than the other way around | 0.4% |
| Feed-In Tariffs market will increase | 0.2% |
| Future industry will be chaos | 0.2% |
| Trade bodies will be consolidated (eg NICEIC & NAPIT) | 0.2% |
| Increase in use of fibre optics | 0.2% |
| More work will be taken on by insurance companies | 0.2% |

| | |
|---|---|
| Conductor material will change from copper | 0.2% |
| Low voltage distribution systems within houses | 0.1% |
| Whole life maintenance will be the norm | 0.1% |
| New infrastructure within the industry | 0.1% |
| More partnership work | 0.1% |
| Rationalisation of plug and socket systems throughout Europe | 0.1% |
| Costs will fall | 0.1% |
| Larger market due to increase in consumption | 0.1% |
| More imported, low quality products | 0.1% |
| More IT skills will be required | 0.1% |
| Products will become less complex for the end user | 0.1% |
| Cost of retrofitting technology will fall | 0.1% |
| Robots | 0.1% |
| 18th Edition will arrive | 0.1% |
| More use of recycled materials | 0.1% |
| More trainees will come into industry | 0.1% |
| More standard products | 0.1% |

Fig A4.5: What do you consider to be the main opportunity for your business – top responses, unprompted

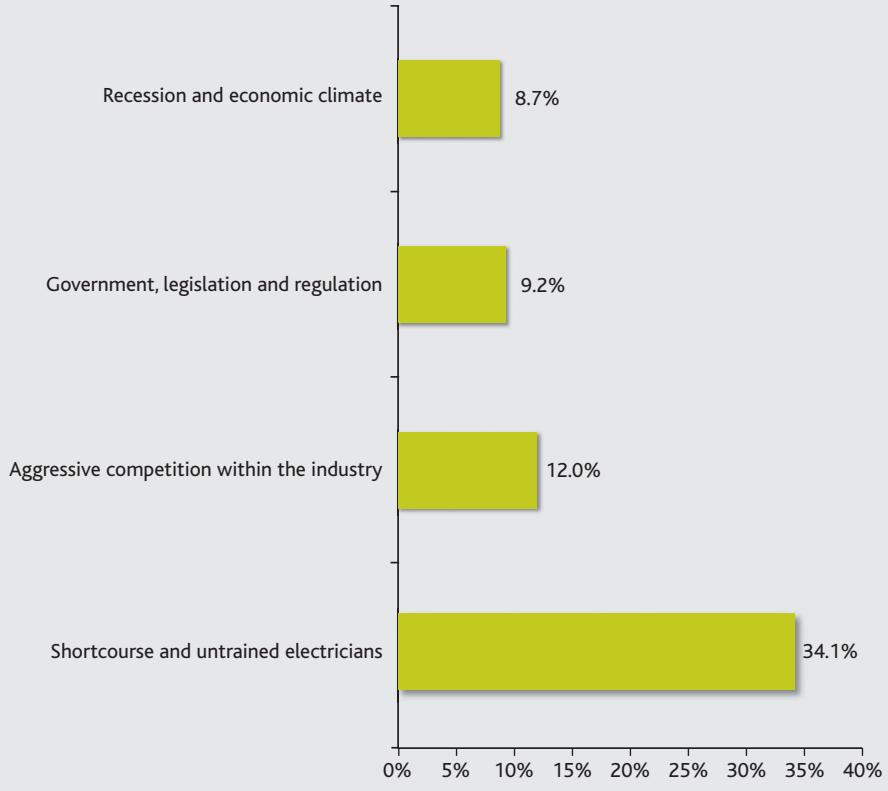


## Table A4.6: What do you consider to be the main opportunity for your business – all responses, unprompted

| | |
|---|---|
| Renewable energy | 19.8% |
| PV & solar | 13.5% |
| Energy saving and energy efficient products and installations | 13.0% |
| New technology (including intelligent building systems, controls and SMART ) | 9.1% |
| Inspection and Testing (including certification & audit roles) | 4.2% |
| Low energy lighting/LEDs | 3.5% |
| Commercial market (including retail, office fit out, industrial) | 3.3% |
| Micro-generation | 3.1% |
| Upgrade of existing systems | 2.8% |
| Domestic Work | 2.8% |
| Provide good quality service | 2.7% |
| Will branch out to encompass non-electrical trades | 2.6% |
| Maintain existing customer base | 2.4% |
| Wind | 1.9% |
| Maintenance work | 1.8% |
| Heating systems | 1.3% |
| Choose a field to specialise in | 1.2% |
| Increase amount of training | 1.1% |
| New build sector (private or commercial) | 0.9% |
| Provide energy efficiency advice | 0.9% |
| Skills shortage (plug the gap) | 0.8% |
| Installation of heat pumps (air source, geothermal etc) | 0.8% |
| Keeping up to date with trends | 0.8% |
| More competitive pricing | 0.7% |
| Longer term contracts (for local government for example) | 0.7% |
| Security and access systems | 0.7% |
| Increase client base | 0.6% |
| Improve marketing strategies | 0.6% |
| Home entertainment systems | 0.6% |
| More partnering | 0.5% |
| Insurance work | 0.5% |
| Community or individual energy generation projects (not Feed-In Tariffs) | 0.5% |
| Offer complete package of services from design through to facilities management | 0.4% |
| Construction/decommissioning of nuclear power stations | 0.4% |
| Increase amount of training | 0.4% |
| Economic recovery of UK | 0.4% |
| Education of customers | 0.4% |
| Temporary power installations | 0.2% |
| Agricultural maintenance | 0.2% |
| Focus on customer care | 0.2% |
| Streamline/reduce size of business | 0.2% |
| Leisure industry | 0.2% |
| Work generated by legislation and regulations | 0.1% |

| | |
|---|---|
| Learn to tackle the paperwork | 0.1% |
| Move away from domestic work | 0.1% |
| Modular wiring | 0.1% |
| RSL Contracts | 0.1% |
| Electric vehicle infrastructure installation | 0.1% |
| Look after employees | 0.1% |
| Stay abreast of technology | 0.1% |
| Networking | 0.1% |
| New consumer unit installation | 0.1% |
| Employ cheaper, foreign labour | 0.1% |
| More survey work | 0.1% |
| Crossrail | 0.1% |
| Keep the personal touch | 0.1% |
| Change of Government | 0.1% |

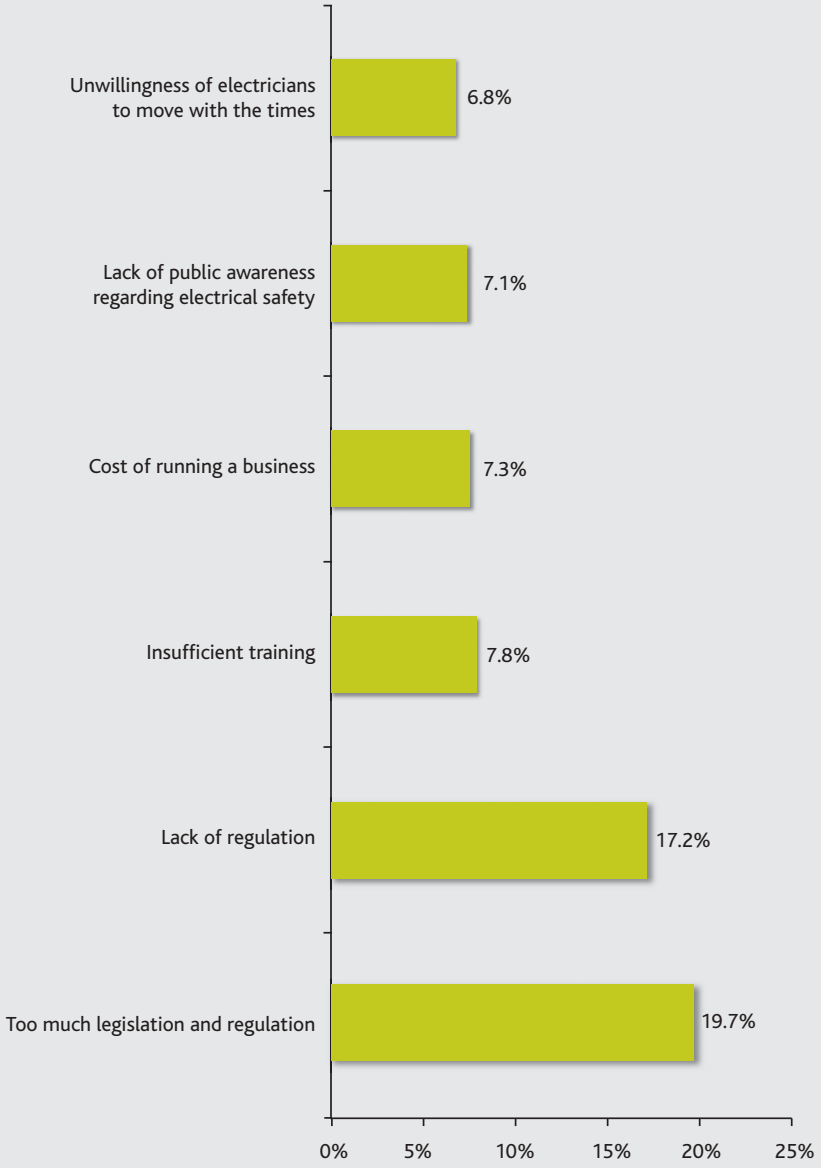
Fig A4.7: What do you consider to be the main threat to your business – top responses, unprompted



## Table A4.8: What do you consider to be the main threat to your business – all responses, unprompted

| | |
|---|---|
| Lack of regulation – 'short course' electricians, untrained electricians, foreign labour, general public able to purchase electrical consumables at DIY stores | 34.1% |
| Aggressive competition within the industry (large companies moving into smaller markets, price wars, all in packages, main contractor procurement strategies) | 12.0% |
| Government, legislation and regulation | 9.2% |
| Recession and economic climate | 8.7% |
| Cashflow problems (banks not lending, customers not paying, debt) | 7.0% |
| Cost of running business to electrician (including material and fuel costs) | 6.5% |
| Paperwork and red tape | 5.9% |
| Customers do not have money to commission work (domestic, private or public bodies) | 3.7% |
| Lack of skilled, well motivated, quality workforce to take on | 3.1% |
| Modular technology, wireless applications leading to less skills required to install | 1.8% |
| Cost of accreditations and certifications | 1.7% |
| Lack of public awareness regarding electrical safety, costs of doing good job, dangers of DIY electrics and unskilled operatives | 1.5% |
| VAT and interest rate increases | 1.4% |
| Lack of work in general | 1.4% |
| Can't keep up with changes in technology and legislation | 1.4% |
| Health and safety constraints | 1.3% |
| Poor quality products and cheap imports | 0.8% |
| Lack of new build | 0.8% |
| Rising cost of electricity and fuel | 0.7% |
| Lack of affordability and incentives for consumer | 0.6% |
| Feed-In Tariffs | 0.5% |
| Difficulty in diversifying | 0.4% |
| LED Lighting leading to lack of maintenance | 0.2% |
| Quantity Surveyors | 0.2% |
| Renewables | 0.2% |
| Difficulties in advertising effectively | 0.2% |
| Companies moving abroad | 0.1% |
| Design and Build | 0.1% |
| Reduction in level of research and development | 0.1% |
| Value engineering | 0.1% |
| Poor quality of training available | 0.1% |

Fig A4.9: What do you consider to be barriers to change in the electrical industry – top responses, unprompted



## Table A4.10: What do you consider to be barriers to change in the electrical industry – all responses, unprompted

| | |
|---|---|
| Government, legislation and regulation, problems with Part P, paperwork and red tape | 19.7% |
| Lack of regulation – untrained electricians, foreign labour, general public able to purchase electrical consumables at DIY stores | 17.2% |
| Problems with training (including lack of apprenticeships, cost, quality of teaching, lack of funding) | 7.8% |
| Cost of running business to electrician (including material, wages and fuel costs) | 7.3% |
| Lack of public awareness regarding electrical safety, costs of doing good job, dangers of DIY electrics and unskilled operatives | 7.1% |
| Unwillingness of electricians to change and move with the times/fear of change | 6.8% |
| Current economic climate (banks not lending, consumers not spending, government cuts) | 4.1% |
| Poor quality and quantity of recruits/skills shortage | 2.5% |
| Health and safety constraints | 2.4% |
| Cost to consumer | 2.1% |
| Too many different bodies involved in sector | 1.7% |
| Existing contract arrangements/tendering process favours big contractors | 1.1% |
| Lack of access for qualified electricians to cut out fuses | 1.1% |
| Fear of change | 1.1% |
| Lack of certification required by legislation in property sector | 0.8% |
| Industry not working together | 0.8% |
| Communication between parties within industry | 0.6% |
| Non-engineers doing electrical design work | 0.6% |
| Electrical Industry is not on a par with the Gas Industry (Gas Safe etc) | 0.5% |
| NICEIC | 0.5% |
| Lack of crossover between trades | 0.4% |
| Change happening too slowly | 0.4% |
| VAT rises | 0.4% |
| JIB | 0.2% |
| Unions | 0.2% |
| Main contractors putting profit before innovation | 0.2% |
| Miss selling of low energy solutions | 0.2% |
| Lack of promotion of industry to consumer | 0.2% |
| Prohibitive costs of consultancy fees | 0.1% |
| Clients not moving with the times | 0.1% |
| Lack of standardisation of fuse boards | 0.1% |
| Cost of certification | 0.1% |
| Elitist attitudes | 0.1% |
| No support for manufacturing in the UK | 0.1% |
| IEE | 0.1% |
| QS | 0.1% |
| CIS | 0.1% |
| Lack of local authority contracts for SMEs | 0.1% |
| Manufacturers and suppliers | 0.1% |
| Oil conglomerates preventing change to electrical powered heating | 0.1% |

Fig A4.11: More training for small businesses in new technology and skills – Opportunity


Fig A4.12: New products to enable sustainable new build and renovation of existing properties – Opportunity


Fig A4.13: Green Deal leading to upgrading 500,000 homes per year – Opportunity


Fig A4.14: Public confidence in competency of contractors – Opportunity

Fig A4.15: SMART meters in every home – Opportunity


Fig A4.16: Local renewable energy and power network grids – Opportunity


Fig A4.17: More apprenticeships – Opportunity


Fig A4.18: Intelligent buildings with integrating control systems – Opportunity

Fig A4.19: 15% of UK total energy to come from renewables by 2020 – Opportunity


Fig A4.20: New skills required for installation and maintenance of new technology – Opportunity


Fig A4.21: Funding for training via Further Education Loans – Opportunity

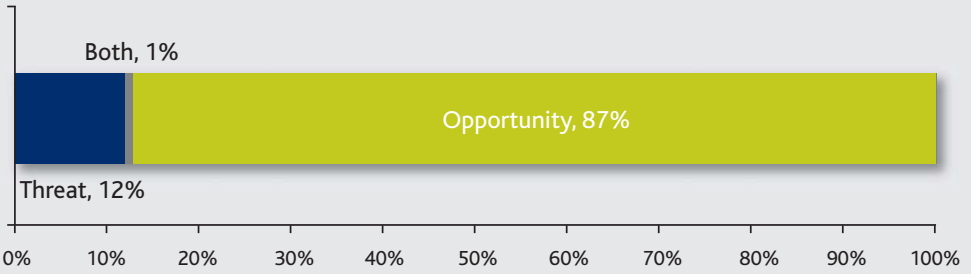



Fig A4.22: Computer literate multi-skilled workers who understand how differing trades must fit together – Opportunity

Fig A4.23: Greater use of wireless technology – Opportunity


Fig A4.24: Increased certification of contractors – Opportunity


Fig A4.25: New forms of procurement and contract between main contractor and sub-contractor – Opportunity

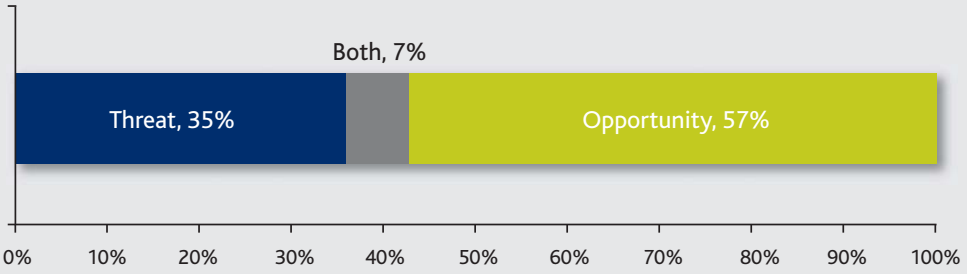



Fig A4.26: Changing government policy – Threat

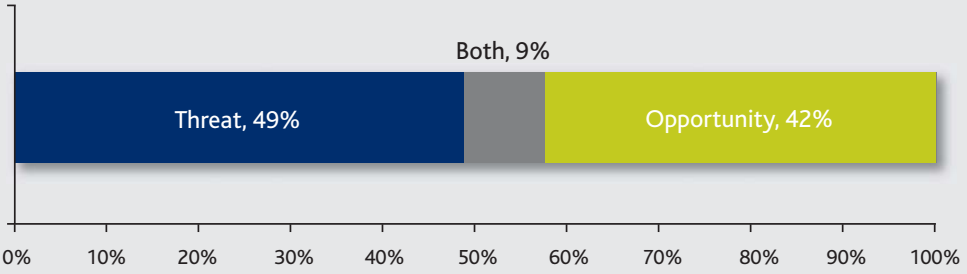


Fig A4.27: More competitive industry – Threat

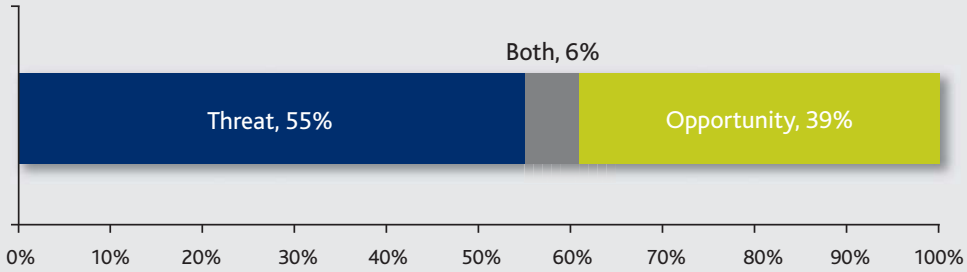



Fig A4.28: Crossover of trades requiring multi-skilling – Threat

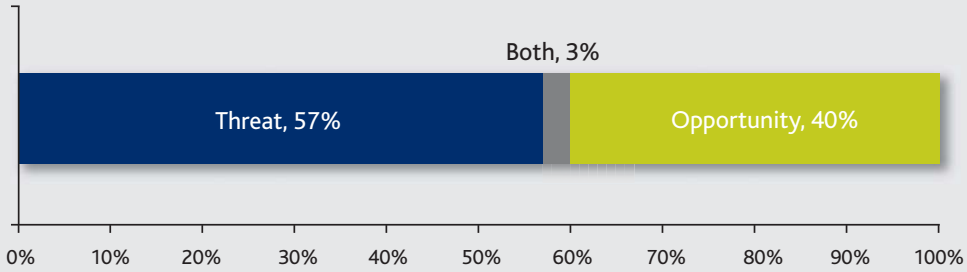



Fig A4.29: More components in new build manufactured off-site, reducing amount of skilled craftsmen on site – Threat

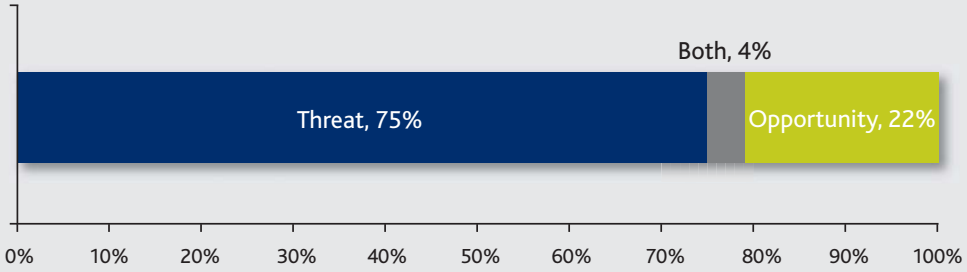
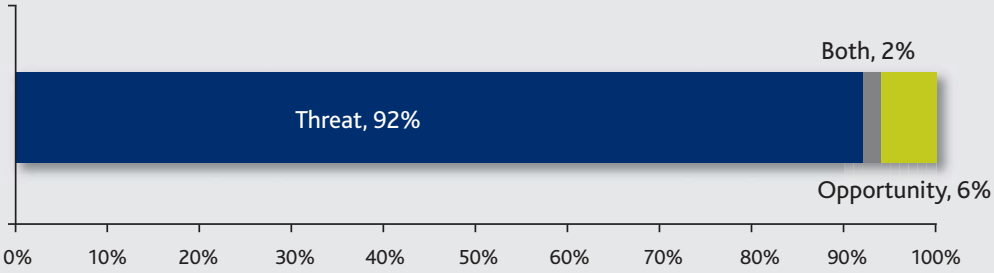
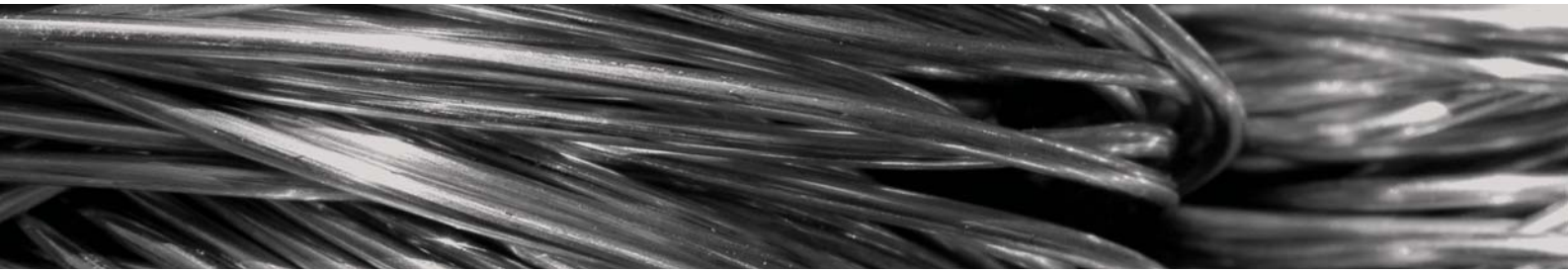



Fig A4.30: Lower skilled workforce doing work currently done by tradespersons – Threat



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