

PUBLIC PERCEPTIONS: NUCLEAR POWER.

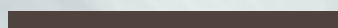
Institution of
**MECHANICAL
ENGINEERS**

**SURVEY RESULTS
2020**

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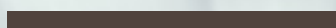
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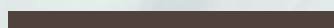
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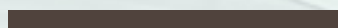
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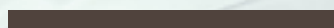
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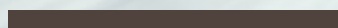
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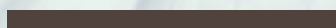
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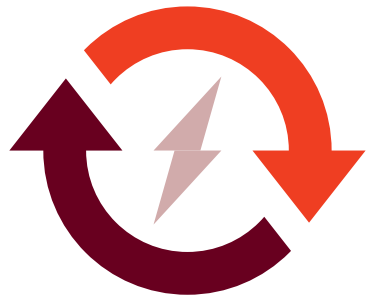
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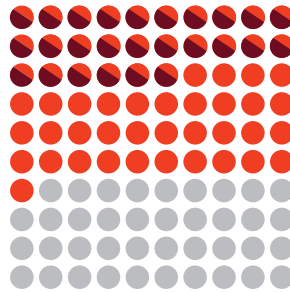
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PUBLIC PERCEPTIONS: NUCLEAR POWER – KEY FINDINGS OF SURVEY

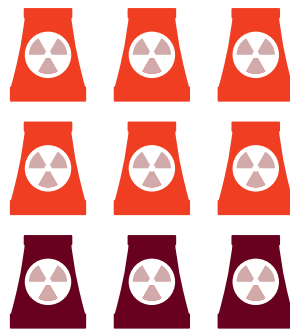
Just over **four in ten** people support the use of nuclear energy for producing electricity in Britain.



This compares to over **eight in ten** who support electricity production from renewable energy sources, and over four in ten who support gas power.



Only **26%** of people aged 18-24 understand nuclear power is a low-carbon source of energy, compared to 61% of 65-74-year olds.



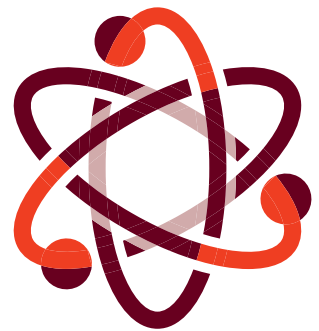
Men are **twice as likely** as women to be positive about nuclear power, with nearly six in ten men supporting it, compared to three in ten women.



People aged 45 and over are **most likely** to back nuclear power.



Highest level of support seen in Scotland (49%) and lowest in Wales and the West (39%)



Just over a quarter of people would support the construction of a nuclear power station in their local area, while four in ten would oppose.

RECOMMENDATIONS

Public Awareness Campaign

There is a low level of awareness among young people that nuclear power is a low carbon source of energy. The Government needs to ensure that nuclear is included in all its communications about low carbon power and energy sources.

The nuclear industry should create stronger messaging about the potential possibilities for nuclear to help create a low carbon, prosperous future for the UK.

01

KEY FINDINGS

- / Just over **four in ten** people support the use of nuclear energy for producing electricity in Britain (42%).
- / A **similar number** (45%) support the use of gas for electricity generation. This compares to over eight in ten who support electricity production from renewable sources (84%).
- / **Only a quarter** of people (26%) aged 18-24 understood nuclear power is a low-carbon source of energy, compared to 61% of 65-74-year olds.
- / Men are around **twice as likely** as women to be positive about nuclear power, with nearly six in ten men supporting it (56%), compared to three in ten women (29%).
- / People aged 45 and over are **most likely** to back nuclear power. There is an almost linear relationship between **age and support** for nuclear power – as age increases, so does the level of support for nuclear.
- / **Highest level of support** seen in Scotland (49%) and lowest in Wales and the West (39%).
- / The most frequently cited **benefits of nuclear power** are 'reliability of energy supply' (43%), 'low carbon energy' (37%), and 'security of future energy supply' (34%).
- / The most commonly selected concerns about nuclear power that people have are '**nuclear waste** / disposal of nuclear waste' (58%), 'safety concerns such as the **risk of accidents**' (44%), and '**radiation**' (35%).
- / Just **over a quarter** of people would support the construction of a nuclear power station in their local area (27%), while, a much larger proportion, four in ten would oppose (41%).
- / People overestimate the **contribution of nuclear power** to the UK's electricity mix, saying on average it produces 42% compared to around 20% in reality.
- / In contrast, estimates of the **contribution of renewable energy** were spot on with people saying 31% on average compared to 33% in reality.

RECOMMENDATIONS

There is a low level of awareness among young people that nuclear power is a low carbon source of energy. The Government needs to ensure that nuclear is included in all its communications about low carbon power and energy sources. The nuclear industry should create stronger messaging about the potential possibilities for nuclear to help create a low carbon, prosperous future for the UK. This will open up greater possibilities for solutions from low carbon fuel production to increased electrification and ensure the UK can meet its net-zero vision.

The responses to the poll show that in order for greater public acceptance of new nuclear power stations, it is important to communicate a credible plan for waste disposal, for example either a geological disposal facility or recycling spent radioactive material.

The poll was carried out by ICM Unlimited and surveyed 2011 adults in Great Britain in December 2019

INTRODUCTION

The Institution of Mechanical Engineers commissioned research into public attitudes towards nuclear power, in particular its role as a low-carbon electricity source. On behalf of the Institution, ICM Unlimited asked seven questions to a nationally representative sample of 2011 people across Great Britain in December 2019.

The questions covered the key issues of:

- / Acceptance of nuclear technology
- / Concerns around nuclear power
- / Understanding of low carbon energy sources
- / Awareness of the contribution of different energy sources

The UK's greenhouse gas emissions have fallen rapidly in recent years, helped by the closure of coal-fired power stations. Whether this trend will continue and help the Government meet its "net zero" emission target by 2050, will depend partly on developments in power generation in the next decade. Indeed, in 2019, global greenhouse gases increased by 0.6%¹.

As public concern about climate change has intensified, the importance of rapidly decarbonising the UK's power system has increased. However, the potential of low carbon electricity sources does not seem to have been effectively communicated, with nuclear being less well understood than renewables

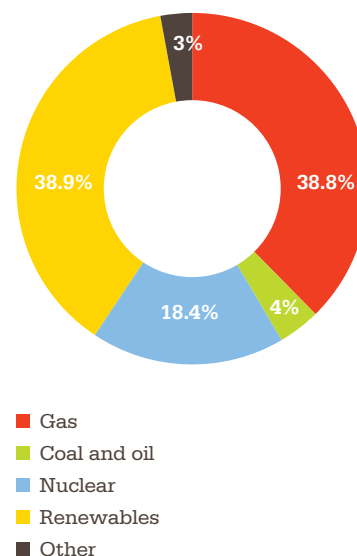
Government policy is to have a mix of energy supplies, using nuclear fission alongside other sources, such as gas, solar and wind. These technologies together could create a fully low carbon, clean electricity supply removing fossil fuels like gas and coal (unless combined with carbon capture and storage) completely from the mix.

Electricity demand has been falling in recent years, but it is set to start rising again with the increasing electrification of transport and, potentially, heat. New nuclear power stations will need to be part of the solution to ensure we meet this growing demand for low carbon electricity.

Nuclear energy can also play a wider role in our energy system. For example, electricity and heat from a nuclear reactor could be used to produce synthetic fuels. Nuclear reactors will continue to be essential for the manufacture of the specific radioactive isotopes necessary in medicine.

Nuclear power provides about a fifth of the UK's electricity supply (graph 1). However, the UK's power stations are ageing and seven of the country's eight nuclear plants will have shut by the end of the 2020s, with only Sizewell B in Suffolk continuing to operate. The government has also committed to shutting the country's remaining coal plants by 2025.

Graph 1. UK electricity generation Q3 2019.



Source: BEIS

1. <https://www.globalcarbonproject.org/carbonbudget/>

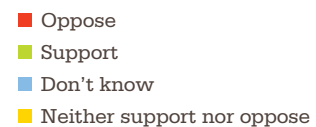
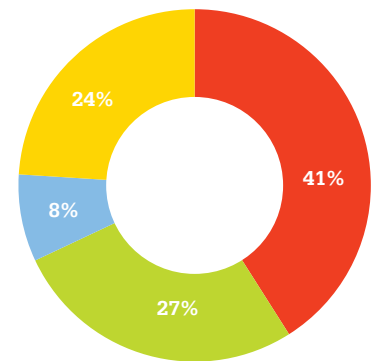
2. <https://www.edfenergy.com/media-centre/news-releases/update-on-hinkley-point-c-project>

The only new nuclear project under construction is EDF Energy's Hinkley Point C, a 3.2 gigawatt (GW) plant in Somerset, which will produce enough power for approximately six million homes when complete. It will be Britain's first new nuclear power station in three decades, with a price tag that has risen to £22.5 billion². The high cost of nuclear power often stems from projects being bespoke, so the economic benefits of replication are not gained.

Soon after taking office in July, British Prime Minister Boris Johnson called for a "nuclear renaissance" in the country. However, the scale of the challenge is highlighted by the fact that three of the plants planned recently to be built to replace the ageing sites have been shelved, mainly due to finance issues. This has incentivised the Government to look into new financing models that enable the delivery of large-scale low carbon infrastructure.

An alternative proposed solution to the difficulty of financing nuclear power has been to make individual reactors smaller and to manufacture as many as possible of the components offsite in a controlled factory environment. Small modular reactors (SMRs) would have a lower cost per unit and potentially offer lower cost electricity in the longer term as the benefits of replication and factory production are realised. The Government has provided funding for eight SMR vendors to conduct feasibility studies of their designs through the Advanced Modular Reactor programme³. A consortium of companies led by Rolls-Royce has also recently been awarded £18 million to support the development of their SMR design⁴. Ensuring the public have confidence in nuclear technology will be key. The poll found four in ten people would oppose a new nuclear power station in their area (graph 2).

Graph 2. What do you think about the construction of a nuclear plant in your area?



3. <https://www.gov.uk/government/publications/advanced-modular-reactor-amr-feasibility-and-development-project>

4. <https://www.rolls-royce.com/media/press-releases/2019/23-07-2019-commitment-to-initial-funding-for-smr-welcomed-by-consortium.aspx>

03

SUPPORT FOR DIFFERENT ENERGY SOURCES

The poll found 42% of people support nuclear power – a level of support that has held broadly steady for many years, based on views expressed in the annual BEIS public attitudes tracker.

Unsurprisingly, support for renewables is high at 84%. It was interesting to note 45% of people in favour of natural gas even though they know it is not low carbon (see section below). Only 20% of people back coal-fired generation (graph 3).

There are wide gender and age differences in attitudes to nuclear power.

Men are around twice as likely as women to support it, with nearly six in ten men in favour (56%), compared to three in ten women (29%).

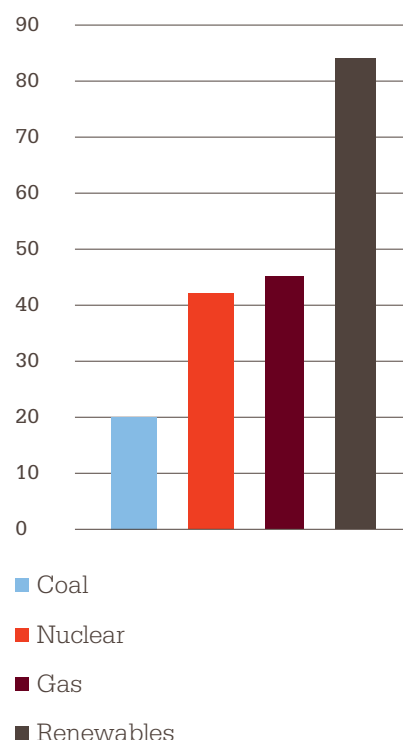
People aged 45 and over are also most likely to be positive. There is an almost linear relationship between age and support for nuclear power – as age increases, so does the level of backing (graph 5).

Support rises from 22% in the 18-24 age category to 58% for 65-74 year olds.

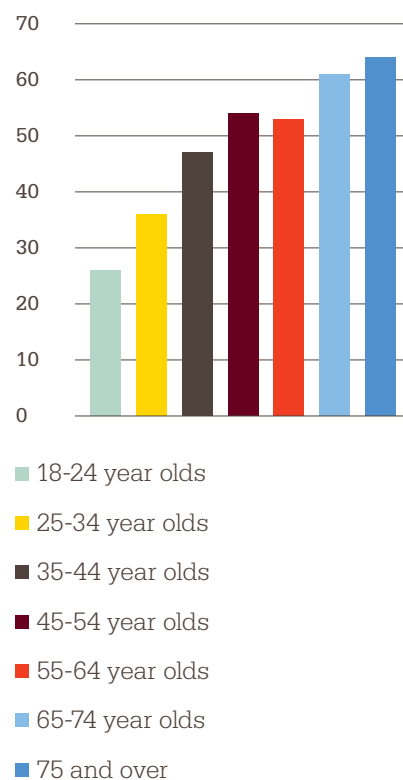
The poll reaffirms the uphill battle that various organisations that have tried to convince young people of the benefits of nuclear power are fighting.

Regionally, Scotland – where just two nuclear power stations operate -- has the highest level of support (49%) despite the Scottish National Party's policy strategy of "opposing new nuclear power". Support is lowest in Wales and the South West, with 39% (graph 6).

Graph 3. Support for energy sources to produce electricity.



Graph 4. Do you agree that nuclear is a low carbon source of energy?



04

WHICH ENERGY SOURCES ARE LOW CARBON?

Understanding about nuclear's low carbon potential broadly mirrors overall attitudes towards the technology. Nearly half UK adults (48%) understand nuclear power is a low-carbon source of energy, with a difference in opinions by gender and age (graph 4).

Men are about twice as likely as women to say it is low carbon, with 60% agreeing compared to just over three in ten women (36%).

Young people are least likely to think nuclear is low carbon. Only 26% of 18-24 years agree with this while 38% disagree. Again, belief that it is low carbon increases in line with age – 61% of 65-74-year olds agree, with only one in ten disagreeing.

People in Scotland are most likely (53%) to say nuclear is low carbon.

As regards other fuels, two thirds of people know coal is not low carbon (65%) but there is more uncertainty about gas with 45% saying it produces low levels of emissions.

05

BENEFITS AND CONCERNS ABOUT NUCLEAR POWER

The most frequently cited benefits of nuclear power are 'reliability of energy supply' (43%), 'low carbon energy' (37%), and 'security of future energy supply' (34%).

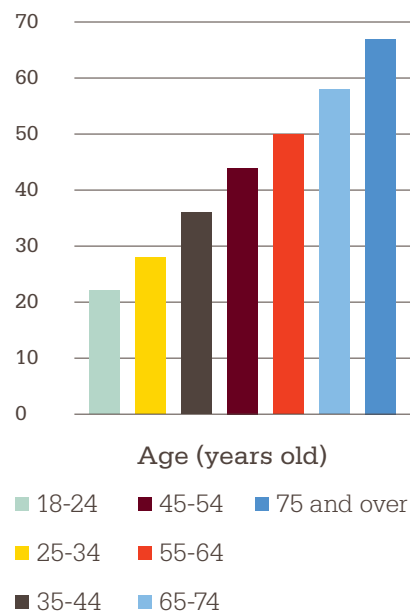
Men were more likely than women to mention reliability of supply (53% vs 34%) and older people were more than twice as likely to mention this than 18-24-year olds.

The public is aware that we need a reliable source of power to ensure the 'lights stay on'. A key benefit of nuclear power is that it provides system benefits to help manage the electricity grid that are not provided by wind and solar.

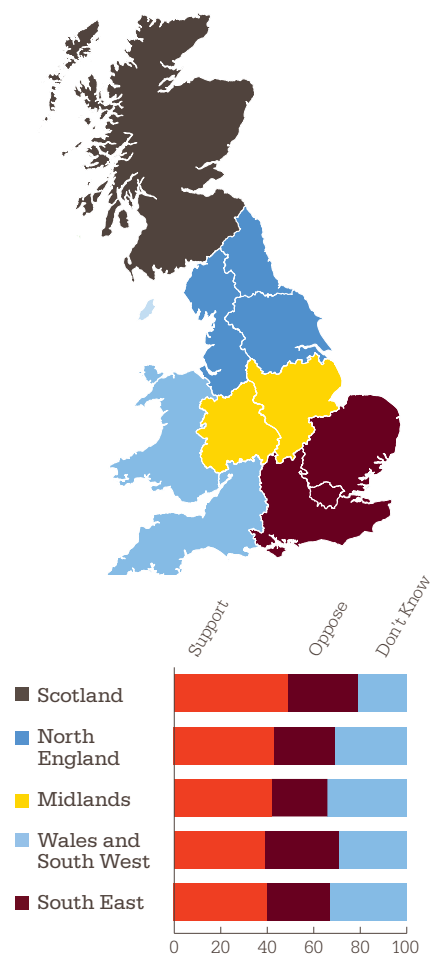
The most commonly selected concerns about nuclear power that people have are 'nuclear waste / disposal of nuclear waste' (58%), 'safety concerns such as the risk of accidents' (44%), and 'radiation' (35%).

The response shows that in order to get public acceptance for new nuclear power stations, it is important to develop a credible plan for a geological disposal facility, which would be an underground store for all radioactive waste from hospitals and power stations. In addition, we need to increase understanding of the potential for recycling of spent nuclear fuel. The Government wants to build an underground waste store but it has been held up by local opposition at all of the proposed sites.

Graph 5. Support for nuclear power by age.



Graph 6. Attitudes by region.*



*Northern Ireland was not included in the poll.

06

AWARENESS OF SMALL MODULAR NUCLEAR REACTORS

Half of respondents (56%) say they have heard of small modular reactors (SMRs), but only 3% know a great deal while 20% know just a little and 26% know nothing but have heard of them.

These results are unsurprising as SMRs are mostly in the design and concept stages. Many countries have deployment plans for new reactors, but few have been constructed to date. It means there is work to do for the Department for Business, Energy and Industrial Strategy, as well as SMR and Advanced Modular Reactor vendors, to build public awareness of the technology.

Ensuring the public have confidence in the technology will be key. The poll found just over a quarter of people would support the construction of a nuclear power station in their local area (27%), while four in ten would oppose (41%).

However, the regional variation in the poll does not have a fine enough resolution to observe another known phenomenon. International studies have shown that people living in the surrounding area of an existing nuclear power station are more likely to strongly support the technology⁵.

5. Bisconti, A.S. (2018), 'Changing public attitudes toward nuclear energy', Progress in Nuclear Energy, Volume 102, Pages 103-113.

07

CONCLUSION

The results of this survey show that the public realises the vital role nuclear has to play in keeping the lights on in the UK and that it can make an important contribution towards helping the UK meet its net-zero target.

However, young people remain sceptical about nuclear power and many are unaware that it is a low carbon source of electricity capable of making a significant difference to the UK's efforts to cut its emissions of greenhouse gases.

There is a lack of knowledge about nuclear technology and continuing concerns about the way nuclear waste is managed.

With the Government aiming to replace ageing nuclear plants and increase nuclear power generation, these survey results show the need for industry and Government to raise awareness about the environmental, economic and employment benefits of nuclear power.

There is also a need to highlight the comprehensive range of safety procedures in place to mitigate risk and environmental damage, with both nuclear power generation and the management of nuclear waste.

Interestingly, although much has been made of the high up-front costs of nuclear power, most people who oppose nuclear power do so because they think it is dangerous or due to environmental concerns, rather than due to cost.

08

RECOMMENDATIONS

There is a low level of awareness among young people that nuclear power is a low carbon source of energy. The Government needs to ensure that nuclear is included in all its communications about low carbon power and energy sources. The nuclear industry should create stronger messaging about the potential possibilities for nuclear to help create a low carbon, prosperous future for the UK. This will open up greater possibilities for solutions from low carbon fuel production to increased electrification and ensure the UK can meet its net-zero vision.

The responses to the poll show that in order for greater public acceptance of new nuclear power stations, it is important to communicate a credible plan for waste disposal, for example either a geological disposal facility or recycling of spent radioactive material.

NOTES

Institution of
**MECHANICAL
ENGINEERS**

One Birdcage Walk
Westminster
London SW1H 9JJ

www.imeche.org
T +44 (0)20 7304 6877
E media@imeche.org
facebook.com/imeche
twitter.com/imeche