

The Institute of Physics

Update on financial links with fossil fuels and arms corporations, April 2021

This document provides an update on information gathered for the report, *Irresponsible Science?: How the fossil fuel and arms industries finance professional engineering and science organisations*¹, published by Scientists for Global Responsibility (SGR) in October 2019. Information sourced from the Institute's publicly available documents is provided first, followed by commentary by SGR.

Investment policy

The Institute of Physics (IOP) has not updated its investment policy since the time of the Irresponsible Science report. The IOP's Ethical investment policy² states that:

"The IOP is a charity established with the objective of promoting the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied. The Trustees would not want the investment decisions of the IOP to result in activities that compromise this objective. In the event that the Trustees consider that any particular classes of investment choices conflict with this objective, they will provide a written list of such classes, or specific investments, to the investment managers and will require them to take such steps as are practicable and cost-effective so as not to invest in these areas."

The IOP has not publicly published details of any such written list.

Investments

At 31st December 2019, the IOP disclosed the following investments:³

Invesco Global Targeted Returns Fund (UK) £9,617,000

Invesco does not appear to release information on the make-up of its Global Targeted Returns Fund. The company is a signatory of the United Nations Principles of Responsible Investment (PRI)⁴. The ShareAction report on investment managers⁵, however, highlights that signing up to supportive initiatives such as the PRI or Climate Action 100+ does not always correspond with having a fit-for-purpose responsible investment approach.

CCLA COIF Charities Property Fund £5,220,000

The CCLA COIF Charities Property Fund is managed in accordance with the policies of the Church of England's Ethical Investment Advisory Group⁶. Among other exclusions, these restrict investments in companies involved in indiscriminate weaponry, conventional weaponry, and companies where more than 10% of revenue are derived from the extraction of thermal coal or the production of oil from oil sands, "on the basis that such companies are

¹ <https://www.sgr.org.uk/publications/irresponsible-science>

² <https://www.iop.org/sites/default/files/2020-08/annual-report-2019.pdf>

³ <https://www.iop.org/sites/default/files/2020-08/annual-report-2019.pdf>

⁴ <https://www.invesco.com/uk/en/about-us/esg-and-responsible-investing.html>

⁵ <https://shareaction.org/wp-content/uploads/2020/06/ShareAction-Climate-Report-III-Final.pdf>

⁶ <https://www.ccla.co.uk/our-policies/climate-change-and-investment-policy>

unlikely to be able to assist with the transition to a low carbon economy".⁷ The agreed ethical investment policies apply to all asset classes including property investments.⁸

Vanguard FTSE Global All Cap Index Fund £6,961,000

Vanguard asks those wanting details of the composition of its Vanguard FTSE Global All Cap Index Fund to make a request and it did respond to SGR's request. The fund does not appear to make any exclusions for ethical or other reasons⁹ and has investments in a number of fossil fuel and arms companies. Vanguard believes in advocating for 'responsible investment' through engagement.¹⁰

Transparency

Whilst the IOP does disclose the three funds holding all its investments, we were not able to ascertain clearly the ethical investment policies of two of these three funds (Invesco and Vanguard) or the make-up of one of the three funds (Invesco). The IOP held a total value of roughly £9.6 million in this fund at 31st December 2019. The third fund, CCLA COIF Charities Property Fund, provided data at 31st December 2020 on its top ten property holdings, totalling 45% of the fund's value.¹¹ It seems reasonable to assume the fund declared a similar % of its holdings at 31st December 2019.

From the information publicly available, we were able to identify the companies in which the IOP holds 43% of its investments. This is a significant improvement on the 10% we were able to identify in our earlier analysis (based on the IOP's 2015 accounts). Of this 43%, we concluded that approximately 2.5% was held in the fossil fuel industry and 1% was held in the arms industry. The percentage of investments held in fossil fuels was markedly less than our previous estimate (22%) while the percentage held in arms was slightly higher than the previous estimate (0%).

Corporate Patrons

IOP does not have corporate patrons or sponsors.

Education programmes

The IOP's Physics in Concert educational materials aimed at 11-16 year olds are still sponsored by Babcock International, a UK-based company, which is part of the consortium building the UK's new nuclear-armed Dreadnought submarines and is also set to make nuclear missile tube assemblies for the US navy.¹²

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<https://www.churchofengland.org/about/leadership-and-governance/ethical-investment-advisory-group/policies-and-reviews>

⁸ <https://www.churchofengland.org/sites/default/files/2017-11/Property%20Investments%20Policy.pdf>

⁹ <https://www.vanguardinvestor.co.uk/rs/gre/gls/1.3.0/documents/2076/gb>

¹⁰ <https://global.vanguard.com/portal/site/institutional/uk/en/investments/responsible-investment-policy>

¹¹ see Fact sheet downloadable from

<https://www.ccla.co.uk/investment-solutions/fund/coif-charities-property-fund>

¹²

<https://www.babcockinternational.com/news/babcock-awarded-multimillion-pound-missile-tube-contract-extension-by-electric-boat/>

Events sponsorship

AWE (the Atomic Weapons Establishment) sponsored the IOP's 2019 Awards Dinner as well as the Awards Dinners for at least the preceding four years, from 2015-2018 inclusive¹³ (SGR could not find data for 2014 and earlier) and the 47th IOP Plasma Physics Conference. The US Office of Naval Research, US Army Research Office and US Air Force Office of Scientific Research are sponsoring the FNANO21 Foundations of Nanoscience conference.

Environmental policy

The IOP's environmental policy¹⁴ includes the statement that:

"We are committed to:

1. Conserving energy; giving preference to renewable sources of energy and related materials.
2. Complying with all applicable environmental legislation and relevant codes of practice.
3. Encouraging all staff to improve their awareness of the environment and to become more environmentally responsible.
4. Using our position to communicate and promote the critical role physics has in establishing a sustainable society.
5. Reducing usage of and emissions from utilities and transport associated with our operations and events.

To achieve this, we aim to:

1. Reduce our use of energy through improvements to energy efficiency and the substitution to renewable energy sources.
2. Minimise waste by reducing consumption and developing effective waste management and recycling procedures.
3. Ensure that all staff are given the opportunity to take an active role in implementing environmental best practice.
4. Work with our suppliers to ensure they share our commitment and practices.
5. Monitor and measure our energy consumption to optimise our energy efficiency."

Other relevant information

IOP's strategy for 2020-2024¹⁵ states that "as a society we face an unprecedented array of challenges. Globally, we need to address a changing climate and a growing population, to decarbonise economies, improve healthcare and ensure water, food and energy supplies. Domestically, we need to develop the next generation of industries to create jobs and improve productivity to safeguard citizens' futures." The third of the strategy's three key challenges is "Public dialogue: We want to show the impact of physics on people's lives, enabling informed public debate about funding and policy in areas including healthcare, climate change and cybersecurity."

¹³ https://www.sgr.org.uk/sites/default/files/2019-10/11-Institute_of_Physics.pdf

¹⁴ <https://www.iop.org/environmental-statement>

¹⁵ <https://www.iop.org/about/strategy>

In its “About us” page online¹⁶, the IOP says “we are proud to be a trusted and valued voice for the physics community”.

IOP’s code of conduct for members includes the statement that members shall:

- “treat others with dignity and respect, act with integrity and shall not intentionally bring the IOP or the staff/other members of the IOP, into disrepute;
- ensure that any professional activities do not unnecessarily put at risk the health, safety or welfare of any person, and they shall have due regard for the effects on the environment and for the sustainability of any resources;”

and that members shall “not recklessly or maliciously damage, or attempt to harm, directly or indirectly, the reputation, prospects, businesses or property of others.”

IOP subsidiary company IOP Publishing is the publisher of Environmental Research Letters (ERL)¹⁷, an open-access journal that covers global environmental change, including climate change. The journal published a paper on “Assessing ExxonMobil’s climate change communications (1977-2014)”¹⁸ in 2017. IOP holds investments in ExxonMobil and numerous other fossil fuels companies (see below).

SGR comments

SGR acknowledges that IOP has a comprehensive environmental statement and is a leader amongst its peers in this regard.

SGR has continuing concerns, however, on the following aspects.

Transparency

IOP’s transparency on its company investments is approximately 43% (see comment above) This low figure makes it difficult to ascertain the extent to which IOP is conducting its investments in a manner that complies with the spirit of its environmental policy and code of conduct for members (see below for details) and that doesn’t, as stated in its investment policy, compromise its objective of promoting the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied. Given that many members of the public are deeply concerned about climate change and many climate modellers have a physics background, IOP’s investment in fossil fuels companies, the full extent of which is unclear, risks compromising this objective and also the standing of the environmental journal ERL produced by IOP subsidiary company IOP Publishing. The third of the IOP strategy’s three key challenges is “Public dialogue: We want to show the impact of physics on people’s lives, enabling informed public debate about funding and policy in areas including healthcare, climate change and cybersecurity.” The IOP’s lack of full transparency, however, removes the possibility of fully informed public debate about its own policy on climate-change-friendly investments.

¹⁶ <https://www.iop.org/about>

¹⁷ <https://erl.iop.org>

¹⁸ <https://iopscience.iop.org/article/10.1088/1748-9326/aa815f>

Last January, the Charity Commission launched an investigation into factors holding charities back from responsible investments¹⁹. With regards to transparency, the regulator said that “People place increasing value on transparency, which research shows is a key driver of public trust in charities.” In its “About us” page online²⁰, the IOP says “we are proud to be a trusted and valued voice for the physics community”. It would seem appropriate for the IOP to provide full transparency with regards to its investments in order to enhance and uphold this trust. Others believe that an increased demand for “transparency, accountability and information about the impact of investments on society” arose after the financial crash of 2008.²¹

Since the release of the Irresponsible Science report, several of IOP’s peers – academic bodies, learned societies and professional institutions in other subject areas – mentioned in the report have tightened up their policies on fossil fuels and arms. For example, the Geological Society introduced investment policies that exclude arms and the most carbon-emitting fossil fuels – thermal coal and tar sands, whilst the Energy Institute brought in an investment policy that excludes arms and presses for alignment with Paris goals.

It is disappointing that during this time period IOP has not introduced any exclusions to its investment policy.

The British Psychological Society, Royal College of Physicians, British Medical Association, the Royal College of General Practitioners, the Faculty of Public Health, the Royal College of Emergency Medicine and the Royal College of Paediatrics and Child Health have all now fully divested from fossil fuels, are in the process of doing so, or have committed to do so. The British Medical Association took the lead, beginning its journey back in 2014. All these organisations also exclude investment in arms companies.

In 2010, following controversy over IOP’s submission to a parliamentary enquiry into the behaviour of climate-change scientists, Evan Harris, a member of the parliamentary science and technology select committee, said: “Members of the Institute of Physics ... may be concerned that the IOP is not as transparent as those it wishes to criticise.”²² Five years after this comment, with regards to its investments, between 2015 and 2020 the IOP’s transparency appears to still be lacking.

Financial links to corporations

We have identified that IOP has recent financial links with the following companies in the arms sector and/or government military bodies:

Sponsorship (education, events)

- AWE
- Babcock International
- US Office of Naval Research
- US Army Research Office
- US Air Force Office of Scientific Research

¹⁹

<https://charitycommission.blog.gov.uk/2020/01/15/how-do-charities-approach-investing-in-line-with-their-purpose-and-values-we-want-to-know-and-we-want-to-help/>

²⁰ <https://www.iop.org/about>

²¹ <https://www.cazenovecapital.com/sysglobalassets/wmmmediaassets/uk/charities/documents/reports/intentionalinvestingreportpdf.pdf>

²² <https://www.theguardian.com/environment/2010/mar/05/climate-emails-institute-of-physics-submission>

Investments

- Airbus
- BAE Systems
- Boeing
- Dassault Systèmes
- Honeywell
- Jacobs Engineering
- L3Harris
- Leidos
- Lockheed Martin
- Northrop Grumman
- Raytheon
- Safran

Twelve of these companies, as well as the US government research bodies, are involved in the manufacture or support of nuclear weapons systems.²³ (Please see the SGR document *Data on arms companies* for further details on company activities.²⁴) Nuclear weapons are now illegal under international law, following the entry into force of the Treaty on the Prohibition of Nuclear Weapons (TPNW) on 22nd January 2021. Although this law only strictly applies in nations that have ratified the treaty, there are significant ethical and legal implications for the IOP – and hence we urge the IOP to sever its financial links to companies and other organisations involved with these weapons of mass destruction. Indeed, looking ahead, the TPNW will increasingly restrict investment in the companies which make nuclear weapons and their associated components and will ultimately lower the value of their shares, increasing the risk of investing in them and the long-term sustainability of accepting money from them as an income source.

IOP's acceptance of money from arms companies and organisations involved in nuclear weapons development for educational materials and for events sponsorship, including the prestigious IOP Awards dinner, is particularly troubling as it publicly promotes this highly controversial industry.

All the financial links with arms companies appear to be in contradiction of a number of IOP policies and strategies including:

- IOP's statement in its strategy for 2020-2024²⁵ that "Globally, we need to address a changing climate and a growing population, to decarbonise economies, improve healthcare and ensure water, food and energy supplies. Domestically, we need to develop the next generation of industries to create jobs and improve productivity to safeguard citizens' futures." SGR thinks that the prioritisation given to military spending and the international arms trade acts to put water, food and energy supplies at risk and harms, rather than safeguards, citizens' futures. The UK government's recent decision to markedly increase its military spending - with a particular focus on weapons technologies - while implementing large cuts to overseas aid spending is a particular striking example of this.²⁶ There is an ongoing debate about the extent to which increases in military spending lead to arms races and increased risks of armed conflict rather than, as the industry claims, improved security.²⁷

²³ https://www.sgr.org.uk/sites/default/files/2021-06/Data_on_arms_companies.pdf

²⁴ https://www.sgr.org.uk/sites/default/files/2021-06/Data_on_arms_companies.pdf

²⁵ <https://www.iop.org/about/strategy>

²⁶ <https://www.sgr.org.uk/resources/brexit-britain-s-security-policy-cutting-aid-spend-weapons>

²⁷ Holden, P. (2016) *Indefensible: Seven myths that sustain the global arms trade*, London: Zed Books

- IOP's code of conduct for members, which states that members shall "treat others with dignity and respect, act with integrity and shall not intentionally bring the IOP or the staff/other members of the IOP, into disrepute" and "ensure that any professional activities do not unnecessarily put at risk the health, safety or welfare of any person" and that members shall "not recklessly or maliciously damage, or attempt to harm, directly or indirectly, the reputation, prospects, businesses or property of others." SGR thinks that associating with the arms industry – the only industry whose work is used to intentionally injure or kill humans - is in direct contravention of these points, particularly given the export of UK arms which have then been used against civilians by the Saudi Arabian military in Yemen and elsewhere. The number of deaths in Yemen – both in combat and indirectly due to lack of food and basic services – was projected to pass 230,000 by the end of 2019, with children accounting for more than half the deaths.²⁸
- IOP's own investment policy, which states that "The IOP is a charity established with the objective of promoting the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied" and that "the Trustees would not want the investment decisions of the IOP to result in activities that compromise this objective." There is significant public concern about the arms industry, including nuclear weapons²⁹ and the use of exported arms against civilians³⁰. We think this concern is such that IOP's investments in the arms industry and acceptance of arms industry sponsorship for educational materials and events could become a barrier to its mission to engage with the public and disseminate knowledge of the science of physics. In addition, holding financial ties to the arms trade may alienate some sections of society more than others, raising concerns about equity and diversity.

SGR has concerns about investments in and financial ties to arms companies by professional science and engineering organisations for these reasons:

- The arms industry exports weapons that fuel conflict and human right abuses. For example, over the decade to 2017, the UK government licensed exports of arms and other military equipment worth £12 billion to 29 of the 30 nations classed as "Human Rights Priority Countries" by the British Foreign Office.³¹ These are nations where "the worst, or greatest number of, human rights violations take place".³² Since 2017, the situation has arguably worsened despite successful legal challenges.³³
- Nuclear weapons have become even more controversial in recent years. The UK government's decision in March to increase the size of the nation's nuclear warhead stockpile by 44% - as announced in the integrated review of defence and security - has been widely condemned. The UN Secretary General's office has stated that it is a breach of Article

²⁸ UN Development Programme (2019) *Assessing the impact of war on development in Yemen*
<http://www.arabstates.undp.org/content/rbas/en/home/library/crisis-response0/assessing-the-impact-of-war-on-development-in-yemen-.html>

²⁹ https://www.icanw.org/change_natwest

³⁰

<https://hansard.parliament.uk/Commons/2021-04-20/debates/2C08829E-5B71-49D8-BC7B-302453BAA3FC/ArmsTradeYemen>

³¹ Action on Armed Violence (2018) "UK arms exports examined."

<https://aoav.org.uk/201/uk-arms-exports-examined/>

³² Foreign and Commonwealth Office (2016) *Human Rights and Democracy, 2015*.

<https://www.gov.uk/government/publications/human-rights-and-democracy-report-2015>

³³ Court of Appeal finds government broke law over Saudi Arabia arms sales

<https://caat.org.uk/news/2019-06-20-2/>

VI of the Nuclear Non-Proliferation Treaty.³⁴ In addition, nuclear weapons have become illegal under international law, following the entry into force of the Treaty on the Prohibition of Nuclear Weapons (TPNW) on 22nd January 2021. As discussed above with regard to specific financial links, although this law only strictly applies in nations that have ratified the treaty, there are significant ethical and legal implications for organizations with ties to companies involved with these weapons of mass destruction. The treaty prohibits ratifying nations from providing assistance – including financial – for corporations involved in the development, manufacture or deployment of nuclear weapons. This will increasingly restrict investment by international banks and other financial institutions in such corporations, potentially making it harder for them to fund their activities and enhancing the risk of investment on financial grounds alone. Furthermore, a series of recent academic research studies involving physicists have warned of the devastating climatic effects of even a small nuclear war.³⁵ SGR's own analysis shows that, if the nuclear warheads carried by just one UK Trident submarine were launched, devastating global climate impacts could result.³⁶ The possibility of a nuclear war by accident - due to human or technical error - remains a very real threat.

- Many members of the public strongly object to arms company sponsorship of educational materials. We note, for example, the recent adverse publicity in the media³⁷ regarding the videos featuring employees and armed forces personnel reading fairy-tales and asking questions about engineering that BAE Systems released for primary school children. Engaging with arms companies seems likely to alienate significant sections of the public from a professional science organization's mission and goals.
- The arms industry removes resources – financial, human, scientific and technological – from efforts to improve the human condition through the pursuit of knowledge. In his 'Chance for Peace' speech in April 1953, US President Dwight D. Eisenhower said: "Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed, those who are cold and are not clothed. This world in arms is not spending money alone. It is spending the sweat of its laborers, the genius of its scientists, the hopes of its children." Eisenhower goes on to compare the relative costs of a bomber and a hospital; these comments seem particularly apposite at a time when the UK has dramatically increased its military spending³⁸ whilst offering most NHS staff a 1% pay rise described as "pitiful" and "insulting".³⁹ It's also become apparent that UK hospitals were underprepared for a pandemic due to lack of funding, whereas the UK was the second highest spender on defence in NATO in 2019, to the tune of some \$59.4 billion. UK plans to send an aircraft carrier to the South China Sea in 2021 highlight that this spending is not for territorial defence alone. The pandemic also heightened awareness that as a nation we are not spending enough to alleviate poverty and health inequality within our own borders let alone internationally. Every child experiencing poverty and health inequality is a child less likely to pursue physics as a career.
- The arms industry perpetuates power imbalances and has the potential to harm democracy. In his farewell address, in 1961, Eisenhower warned against the economic, political and "even spiritual" influence of the immense military establishment and large arms industry

³⁴<https://www.independent.co.uk/news/uk/politics/boris-johnson-uk-nuclear-weapons-international-law-b1817827.html>

³⁵ <https://www.nature.com/articles/d41586-020-00794-y>

³⁶ <https://www.sgr.org.uk/index.php/publications/uk-nuclear-weapons-catastrophe-making>

³⁷ <https://www.independent.co.uk/news/uk/politics/arms-companies-fairy-tale-stories-bae-b1780982.html>

³⁸

<https://www.gov.uk/government/news/pm-to-announce-largest-military-investment-in-30-years#:~:text=The%20Government%20has%20already%20pledged,compared%20to%20last%20year's%20budget.>

³⁹ <https://www.bbc.co.uk/news/uk-56313199>

that had arisen as a result of the Second World War with grave implications for the structure of society. “In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex,” he said. “The potential for the disastrous rise of misplaced power exists and will persist. We must never let the weight of this combination endanger our liberties or democratic processes.”

- Financial ties to arms companies make it more difficult for professional science and engineering organisations to raise ethical and other concerns, including in educational materials and public discussion, about the use of science and engineering within the arms industry.
- Warships, combat planes, transport planes and tanks are heavy consumers of fossil fuels. The US Department of Defense is the world’s largest institutional consumer of petroleum, with annual greenhouse gas emissions greater than that of whole European nations such as Sweden.⁴⁰ SGR estimates that the UK military carbon footprint is equivalent to that of 6 million average cars.⁴¹ National emission targets routinely exclude military carbon emissions, and even data on current emissions is sparse and unreliable for the vast majority of nations.⁴²
- A large number of companies involved in the international arms trade have been linked to major corruption, fraud and other malpractice scandals. A review by the Stockholm International Peace Research Institute (SIPRI) found that “studies suggest that corruption in the arms trade contributes roughly 40 per cent to all corruption in global transactions”.⁴³ Given that many professional engineering and science organisations include strong wording on corrupt behaviour in their codes of conduct, it appears that such organisations should be extremely careful concerning links of a financial or promotional nature with corporations found guilty of such behaviour, or else risk their reputation and the reputation of the wider science and engineering community.

We have identified that IOP has recent financial links with the following companies in the fossil fuels sector - through its investments in the Vanguard fund stated above:

- Anglo American
- BASF
- BHP
- BP
- Chevron
- ConocoPhillips
- Devon Energy
- Dow
- Duke Energy
- Eni
- EOG Resources
- Equinor
- ExxonMobil
- FirstEnergy
- Gazprom

⁴⁰ Crawford, N (2019) *Pentagon Fuel Use, Climate Change, and the Costs of War*
<https://watson.brown.edu/costsofwar/papers/ClimateChangeandCostofWar>

⁴¹ <https://www.sgr.org.uk/publications/environmental-impacts-uk-military-sector>

⁴² <https://www.sgr.org.uk/publications/under-radar-carbon-footprint-europe-s-military-sectors>

⁴³ Feinstein, A., Holden, P. and Pace, B. (2011) *Corruption and the arms trade: sins of commission in SIPRI Yearbook 2011*, Oxford, Oxford University Press

- Glencore
- Halliburton
- Lukoil
- Mitsui
- Marathon Petroleum
- NextEra Energy
- Occidental Petroleum
- Pembina Pipeline
- Petroleo Brasileiro (Petrobras)
- Rio Tinto
- Royal Dutch Shell
- Saudi Arabian Oil
- Schlumberger
- Suncore Energy
- Total
- Woodside Petroleum

These links to fossil fuel companies are concerning for a number of reasons:

- These links appear to be at odds with the IOP's environmental statement⁴⁴, which states that it is committed to contributing to the reduction of local, national and global environmental damage and to "work with our suppliers to ensure they share our commitment and practices". It could be argued that the companies in which IOP holds shares are suppliers of investment services and income, and that the fossil fuel companies in which IOP invests (with the exception of NextEra) have emission pathways that lie outside the 'well below 2°C' target enshrined in the Paris Agreement⁴⁵ and so do not share practices that reduce local, national and global environmental damage (see further discussion below).
- The IOP's environmental statement is also "designed to be a focus for heightened environmental awareness, encouraging staff to assess the environmental impacts arising from their activities and seeking ways to mitigate adverse impacts and improve environmental performance." We hope that the IOP finance director and Council members feel encouraged by this statement to assess the environmental impacts arising from their investment activities and seek ways to mitigate adverse impacts and improve environmental performance. We also hope that they provide publicly-available evidence that they have done this.
- IOP's investment advisers Lane Clark and Peacock have a blog article entitled "Responsible trustees aim for net zero"⁴⁶. We at SGR agree but it appears that IOP's investment policy does not incorporate this approach, despite IOP's mention of the need to decarbonise economies in its 2020-2024 strategy. It appears that the IOP's investments in fossil fuels are at odds with both its environmental statement and 2020-2024 strategy.
- We note that your investment policy states that "The IOP is a charity established with the objective of promoting the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied" and that "the Trustees would not want the investment decisions of the IOP to result in activities that compromise this objective." We believe that public concern about climate change - some 80% of the public is fairly or very concerned about climate change⁴⁷ - is such that IOP's investments in fossil fuel companies,

⁴⁴ <https://www.iop.org/environmental-statement>

⁴⁵ https://www.sgr.org.uk/sites/default/files/2021-06/Data_on_fossil_fuel_companies.pdf

⁴⁶ <https://www.lcp.uk.com/our-viewpoint/2021/01/responsible-trustees-aim-for-net-zero/>

⁴⁷ <https://www.carbonbrief.org/guest-post-rolls-reveal-surge-in-concern-in-uk-about-climate-change>

could become a barrier to its mission to engage with the public and disseminate knowledge of the science of physics and so do not comply with IOP's own investment policy.

- Similarly, IOP's investments in fossil fuel companies, were it more widely publicized, could become a barrier to IOP's advancement and dissemination of knowledge and education amongst the climate science community. More than 150 scientists, engineers and academics working in, and students of, climate change have signed SGR's new Science Oath for the Climate and committed to holding their professional associations, institutions and employers to the same standards on climate change as they've committed to themselves⁴⁸.

More generally, SGR has concerns about investments in and financial ties to fossil fuel companies by professional science and engineering organisations for these reasons:

- According to the Transition Pathway Initiative⁴⁹, the long-term ambitions of many fossil fuel companies do not align with a pathway that would limit global warming to 2°C or below. (Please see the SGR document *Data on fossil fuel companies* for further details⁵⁰.) The goal of the UN's 2015 Paris Agreement is "to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels"⁵¹. What's more, many fossil fuel companies have not committed to meeting the rigorous criteria set by the Science Based Targets Initiative⁵² for emissions reductions, which numerous other leading corporations have signed up to. Until fossil fuel companies meet the criteria of the Science Based Targets initiative and have set targets to limit their emissions by 2050 in line with a 1.5 or 2°C limit to warming, we are urging thought leaders such as the IOP to divest from these companies and so keep up the pressure on them.
- Professional science and engineering organisations have considerable influence with politicians and the public and it's crucial that they put in place robust science-based targets and plans that are compatible with the goals of the Paris Agreement - and end lobbying behaviour that could undermine it - particularly in the year that the UK is hosting the next round of the COP climate negotiations.
- As the UK Health Alliance on Climate Change⁵³ puts it, "engaging with companies whose business model relies on fuel extraction is of limited use—only divestment will stop extraction". Worldwide, according to the Alliance, over 1,000 organisations with £7 trillion assets have committed to divesting from fossil fuels and instead investing in climate solutions⁵⁴. Research indicates that divestment reduces the price of fossil fuel shares. According to a team at the University of Waterloo in Canada⁵⁵, "lower share prices increase the costs of capital for the fossil fuel industry, which in turn decreases their ability to explore new resources and exploit proven resources". The greater the likelihood of these fossil fuel resources staying in the ground, the more likely we are to meet the international climate change targets agreed under the Paris Agreement in order to prevent potentially catastrophic climate change.

⁴⁸ <https://www.sgr.org.uk/projects/science-oath-climate-text-and-signing>

⁴⁹ <https://www.geolsoc.org.uk/~media/shared/documents/policy/Statements/responsible%20investing%20draft%20graphics%20v35.pdf?la=en>

⁵⁰ https://www.sgr.org.uk/sites/default/files/2021-06/Data_on_fossil_fuel_companies.pdf

⁵¹ <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

⁵² <https://sciencebasedtargets.org/>

⁵³ ukhealthalliance.org/divestment

⁵⁴ <https://www.divestinvest.org/11-trillion-counting-divestinvest/>

⁵⁵ <https://theconversation.com/how-divesting-of-fossil-fuels-could-help-save-the-planet-88147>

- In order to keep to the ‘well below 2°C’ target, only one-fifth of known fossil fuel reserves can be burned, putting these assets at risk of becoming stranded⁵⁶. The fraction is even smaller when considering how to meet the 1.5°C target. According to the UK Health Alliance on Climate Change, fossil fuels are an increasingly risky investment and fossil fuel free indexes equalled or outperformed unsustainable alternatives for 5-10 years. "Divestment announcements by prominent investors signal financial risks to the market, which in turn depress share prices," say the University of Waterloo researchers. "Therefore, divestment announcements can have a measurable impact on the fossil fuel industry." Shell said in 2018 that divestment had become a material risk to its business⁵⁷. In 2020 fund manager CCLA, which invests on behalf of charities including Church of England dioceses and IOP, dropped its investments in oil giants Shell and Total⁵⁸ for financial reasons. On January 27th 2021, ratings agency S&P warned 13 oil and gas companies, including Royal Dutch Shell and Total, that it is considering downgrading their credit ratings. The agency has increased its risk rating for the oil and gas sector as a whole from “intermediate” to “moderately high” because of the move away from fossil fuels, poor profitability and volatile prices, according to news reports⁵⁹.
- Many fossil fuel companies are relying on carbon capture technology and nature-based solutions being deployed at a huge scale to offset their planned emissions⁶⁰. Heavy reliance on the global scale deployment of carbon capture and storage technologies is misplaced given the lack of progress in this area for the last 20 years. According to scientists⁶¹, such technologies are being developed but are “expensive, energy intensive, risky, and their deployment at scale is unproven. It is irresponsible to base net zero targets on the assumption that uncertain future technologies will compensate for present day emissions”.
- Use of fossil fuel sponsors for educational materials is likely to alienate young people and present them with difficult ethical choices, particularly given the high participation in the Youth Strike 4 Climate movement.

For those keen to retain support for the energy sector, there are plenty of companies that are much more progressive than fossil fuel companies in which to invest. For example, Orsted (formerly DONG, Danish Oil and Natural Gas) has shifted from being a fossil fuel dominated company to one heavily focused on renewable energy. Similarly, some large German engineering companies, such as Siemens and E.ON⁶², have also made major shifts away from fossil-fuel related work.

⁵⁶ https://www.banktrack.org/download/unburnable_carbon/unburnablecarbonfullrev2.pdf

⁵⁷ <https://www.theguardian.com/commentisfree/2019/oct/13/divestment-bank-european-investment-fossil-fuels>

⁵⁸ <https://www.divestinvest.org/church-of-england-fund-drops-remaining-fossil-fuel-investments/>

⁵⁹ https://www.theguardian.com/business/2021/jan/27/rating-agency-sp-warns-13-oil-and-gas-companies-they-risk-downgrades-as-renewables-pick-up-steam?CMP=Share_iOSApp_Other

⁶⁰ <https://insideclimatenews.org/news/16072020/oil-gas-climate-pledges-bp-shell-exxon/>

⁶¹ <https://www.climatechangenews.com/2020/12/11/10-myths-net-zero-targets-carbon-offsetting-busted/>

⁶² Siemens has committed to the 1.5°C target under the SBTi and E.ON’s carbon emissions are aligned with the below 2°C pathway according to TPI.