Building our Industrial Strategy – Green Paper
Response from Scientists for Global Responsibility (SGR)
April 2017

About SGR

Scientists for Global Responsibility (SGR) is an independent UK organisation, whose membership includes natural scientists, social scientists, engineers and architects. We have about 750 members. We promote science, design and technology that contribute to peace, social justice, and environmental sustainability. We carry out research, education and advocacy activities to further this aim. UK industrial strategy is a major concern of ours, and we have written extensively on UK policies relating to science, technology, energy, security and the environment – see our website.[1] This response was compiled by Dr Stuart Parkinson, Executive Director, in consultation with SGR's National Co-ordinating Committee, which is elected by SGR's membership.

Summary

SGR welcomes the publication of a Green Paper on industrial strategy, and especially the Prime Minister's desire for industry to contribute to "a fairer society – where wealth and opportunity are spread across every community." There is a great deal of evidence from social science research indicating that increases in equality contribute to many aspects of the well-being of people in society.[2] We also welcome several other aspects of the Green Paper, including the aim to improve STEM skills across society, the aim to improve infrastructure to help provide a range of benefits, and the planned increases in public spending on R&D.

However, our view is that the Green Paper suffers from a number of serious shortcomings:

1. Sustainable development should be a cornerstone of the industrial strategy, but it is not even mentioned. The narrow focus on economic indicators to measure progress is, we think, likely to lead to more detrimental impacts on society and the environment.
2. Key industrial areas such as energy conservation, renewable energy, energy storage, community energy and public transport are only given limited attention – yet they should be prioritised so that the UK can play a leading role in tackling climate change and other major environmental problems. There is also no recognition of the potential of concepts such as the 'circular economy' in helping industry to embed environmentally sustainable practices within the workplace.
3. There is no recognition of the serious ethical problems associated with the UK's military industry, especially in its exports of arms and other equipment to regimes with very poor human rights records.
4. There is no acknowledgement of the continuing problem of corporate corruption, and the need to tackle it.

We make a number of recommendations to deal with these shortcomings, including:

- setting social and environmental goals for the strategy, as well as economic ones;

[1] http://www.sgr.org.uk/
[2] See, for example: Wilkinson R, Pickett K (2010). The Spirit Level: why equality is better for everyone. Penguin.

- ending the preferential treatment given to industries involved in fossil fuels – especially 'unconventional' sources – and nuclear technologies;
- shifting funding from military industry to civilian industries;
- embedding concepts such as responsible innovation and the circular economy within the strategy; and
- including anti-corruption policies as part of the strategy.

1. Sustainable development

1.1 Industrial strategy aims
(Consultation questions: 1, 2, 5, 31, 32, 33, 34)

Britain – and the Conservative Party – has long endorsed the concept of sustainable development as a key facet of government policy. In 1994, John Major's government published the UK's first sustainable development strategy.[3] In 2015, David Cameron's government was one of 193 which agreed the new UN Sustainable Development Goals (SDGs). Hence it is mystifying that sustainable development is not even mentioned once in the Green Paper.

Sustainable development is generally defined as "development that meets the needs of the present, without compromising the ability of future generations to meet their own needs".[4] Put another way, it is the principle that social, environmental and economic goals are balanced in our society. The Green Paper's narrow focus on economic goals fundamentally undermines this. Indeed, the House of Commons International Development Committee concluded, in its report last year on implementing the SDGs, that there was "a worrying lack of engagement in the SDGs across Government" and recommended that all departments – including BEIS – include contributing to the goals in their 2015–2020 Single Departmental Plans.[5] Not only does SGR agree with this recommendation, we think that the concept of sustainable development should be an over-arching goal of the UK's industrial strategy.

Furthermore, the recent report[6] from the House of Commons BEIS Committee argues that the industrial strategy should be more 'mission-based' – defined by a number of goals – and less 'sector based'. Not only would this be more likely to result in a range of social, economic and environmental benefits, it would also avoid the risk that powerful incumbent industries and corporations try to 'bend' the strategy to suit their own narrow interests.

To this end, we make suggestions for some goals for the UK in areas where SGR has expertise:

1. Air quality in all urban areas to meet EU targets by 2018[7]

---

[3] HM Government (1994). Sustainable Development: The UK Strategy. Cm 2426. HMSO.
[4] Sustainable Development Commission. http://www.sd-commission.org.uk/pages/what-is-sustainable-development.html
[5] House of Commons International Development Committee (2016). UK implementation of the Sustainable Development Goals. HMSO. https://www.publications.parliament.uk/pa/cm201617/cmselect/cmintdev/103/103.pdf
[6] House of Commons Business, Energy and Industrial Strategy Committee. Industrial Strategy: First Review. https://www.publications.parliament.uk/pa/cm201617/cmselect/cmbeis/616/616.pdf
[7] This would mean the UK conformed with EU legal requirements.

2. Phase out exports of arms to authoritarian regimes by 2020[8]
3. End fuel poverty by 2025[9]
4. Double employment levels in renewable energy, energy conservation and energy storage sectors by 2025[10]
5. Net zero carbon emissions across society by 2040[11]

1.2 STEM education aims
(Questions: 8, 10, 11, 13, 14)

While SGR welcomes the emphasis on improving STEM skills across society, we also strongly recommend that the teaching of STEM includes improving understanding of the social, environmental and ethical contexts relevant to science and technology. This is completely neglected in the Green Paper, despite being a recommendation of the UN Educational, Scientific and Cultural Organisation (UNESCO).[12] Furthermore, it would offer the opportunity for a wider range of people to become involved in scientific and technological work.

2. Environmentally sustainable technologies and practices

2.1 The low carbon economy
(Questions: 1, 2, 5, 17, 19, 23, 27, 28, 29, 30, 31, 32, 33, 34)

It is encouraging that the transition to a low carbon economy is envisaged within the Green Paper as an important part of the UK's industrial strategy. However, there is, we think, a complacency within the Paper as it suggests (pp.89-96) that the focus in the energy sector needs to move away from climate change towards affordability and innovation. Such a position, we think, is flawed in a number of ways.

Firstly, as analysis by the Committee on Climate Change demonstrates,[13] climate policies have not, as is commonly believed, led to an increase in household energy bills. Indeed, overall these policies have led to a net fall. The analysis also found that, while some energy-intensive manufacturing sectors do face higher costs from climate policies, those deemed most 'at risk' are largely compensated for those costs.

---

[8] Consistent with economic analysis of demilitarisation strategies – see, for example: Campaign Against Arms Trade (2014). Arms to Renewables: Work for the Future. https://www.caat.org.uk/campaigns/arms-to-renewables/arms-to-renewables-background-briefing.pdf

[9] Consistent with analysis by, for example, Energy Bill Revolution: http://www.energybillrevolution.org/whats-the-campaign/

[10] Consistent with recent trends in sectoral growth internationally – see, for example: IRENA (2016). Renewable Energy and Jobs – Annual Review 2016. http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Jobs_Annual_Review_2016.pdf

[11] Consistent with 2C scenarios for the UK advocated by Prof Kevin Anderson, Tyndall Centre for Climate Change Research – see, for example: Parkinson S, Mumford P (2014). Mind the carbon gap. SGR website. http://www.sgr.org.uk/resources/mind-carbon-gap

[12] See, for example: World Commission on the Ethics of Scientific Knowledge and Technology (COMEST). http://www.unesco.org/new/en/social-and-human-sciences/themes/comest/comest-background/

[13] Committee on Climate Change (2017). UK climate action has reduced emissions without increases in household energy bills. https://www.theccc.org.uk/2017/03/16/uk-climate-action-has-reduced-emissions-without-increases-in-household-energy-bills/

Secondly, there has been a failure of government policy on household energy efficiency since 2012 – exemplified by the huge reduction in the number of measures fitted per year following the introduction of the Green Deal.[14] Without this failure, fuel poverty would likely be at significantly lower levels. Appropriate support for the home energy conservation sector, including through well managed government programmes, would rectify this problem. It is positive, however, to see industrial energy efficiency and the roll-out of smart meters given attention within the Green Paper. Nevertheless, energy conservation across the economy needs to be much more of a priority – and this would be helped if it were made a focus for infrastructure spending.

Thirdly, again as pointed out by the Committee on Climate Change,[15] the government's policies on climate change fall well short of those necessary to meet the latest carbon targets agreed under the UK Climate Change Act.

Turning specifically to the energy supply industries, the government's recent focus on support for large new nuclear power stations and shale gas from hydraulic fracturing (fracking) are increasingly being shown to be very problematic. The global nuclear industry is in serious financial trouble – shown not least by the bankruptcy of Westinghouse, the huge cost over-runs on the construction of new French and Finnish plants, and the major financial problems of EDF. It is becoming abundantly clear that the economics of nuclear power are far worse than its advocates have claimed. Meanwhile the unresolved questions over the environmental and health impacts of fracking, coupled with the difficulty of marrying this technology with a low carbon economy,[16] have led to very low levels of UK public support for this technology.[17]

At the same time, the rapid global expansion and associated major price falls of wind power and solar power have made these technologies the bedrock of the current energy transition internationally.[18] They also offer important opportunities for community-led schemes. The UK government has responded by withdrawing much of the financial and institutional support for these technologies. Only support for offshore wind power has been protected. While some cuts in financial support may be justified as technology prices fall, the scale of cuts is, we think, completely unjustified. Furthermore, to give local communities greater powers to block onshore wind farms, while removing the ability of local councils to block fracking projects is, we think, economically and environmentally unsound.

---

[14] Energy Bill Revolution (2014). ECO and the Green Deal. http://www.energybillrevolution.org/wp-content/uploads/2014/07/ACE-and-EBR-fact-file-2014-06-ECO-and-the-Green-Deal.pdf

[15] Committee on Climate Change (2016a). Concrete action needed to meet UK climate commitments following Paris Agreement and Brexit vote. https://www.theccc.org.uk/2016/10/13/concrete-action-needed-to-meet-uk-climate-commitments-following-paris-agreement-and-brexit-vote/

[16] See, for example: Committee on Climate Change (2016b). The compatibility of UK onshore petroleum with meeting the UK's carbon budgets. https://www.theccc.org.uk/publication/onshore-petroleum-the-compatibility-of-uk-onshore-petroleum-with-meeting-carbon-budgets/

[17] BEIS (2017). Energy and climate change public attitude tracker: wave 20. February. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/602451/Summary_of_key_findings_BEIS_Public_Attitudes_Tracker_-_wave_20__2_.pdf

[18] Bloomberg (2016). Wind and Solar Are Crushing Fossil Fuels. April. https://www.bloomberg.com/news/articles/2016-04-06/wind-and-solar-are-crushing-fossil-fuels

The government may be concerned about the variability of wind and solar power, but the recent rapid growth of the battery industry is an indication of the potential of energy storage technologies. We are encouraged to see that energy storage is one of the areas being considered for support via a new research institution and under the Industrial Strategy Challenge Fund. We strongly support this, but are concerned that the government does not appreciate the speed at which the industry is expanding – for example, new financial analysis is now projecting a global market of over $250bn by 2025.[19] We also urge more support for 'solar fuel' and 'power-to-gas' technologies.[20] We think there is particular potential to generate carbon neutral sources of methane by using electricity from renewable sources to generate hydrogen which is then converted to methane to be fed into the gas grid. Again, this can fulfil a 'balancing' role in a grid supplied by wind and solar power.

There is also much potential for other renewable energy technologies, such as anaerobic digesters and tidal lagoons. Again, use of such technologies would complement wind and solar. In some of these British industry is already a leader. We are very concerned, however, that these options do not even receive a mention in the Green Paper.

In general, we think the government markedly underestimates the economic, social and environmental benefits of an energy transition led by energy conservation, renewable energy and energy storage, due to past reliance on fossil fuels and nuclear technologies.

It is encouraging, however, to see the government's current large-scale funding to accelerate the transition to ultra-low emissions vehicles. This is one of the areas, we note, where strengthened regulation – on both local air pollution and climate change – could assist innovation. It continues to be a very serious problem that the UK is not meeting air quality levels in many of its towns and cities due to pollutants mainly from the nation's cars.

On transport infrastructure, we are encouraged by the government support for improved rail networks, but there is no mention of improvements in bus services – which have often faced cuts due to reductions in local government budgets. Furthermore, the continued emphasis on expansion of road and airport capacity runs counter to efforts to improve air quality and tackle climate change.

We are disappointed that the Green Paper fails to include support for the concept of the 'circular economy', which focuses on maximising the resource efficiency of the economy. The concept can be applied at the business, sector and economy level, and represents a practical way to implement sustainable production and consumption policies. This concept is being championed in the UK by the Ellen MacArthur Foundation,[21] and applied in some of the world's leading corporations, such as Google.

---

[19] The Telegraph (2017). Old energy order draws to a close amid battery storage revolution. March. http://www.telegraph.co.uk/business/2017/03/04/old-energy-order-draws-close-amid-battery-storage-revolution/

[20] See, for example: Chapter 7 of: Goodall C (2016). The Switch. Profile Books; Chapter 13 of: Barnham K (2015). The Burning Answer. Orion Books.

[21] Ellen MacArthur Foundation. https://www.ellenmacarthurfoundation.org/

2.2 Industrial Strategy Challenge Fund
(Questions: 5, 6, 8)

Regarding those technologies which could be prioritised by the Industrial Strategy Challenge Fund, we especially recommend:

- third generation solar photovoltaics;
- batteries, solar fuels, power-to-gas and other energy storage technologies;
- eco-ships, for example, those that are wind- and solar-assisted.

We are concerned, however, about the current enthusiasm over, for example, small modular nuclear reactors (SMRs), autonomous robotics and synthetic biology. These areas have significant social and environmental risks associated with them. Many of the SMR designs under consideration raise significant questions over radioactive waste management and the proliferation of military nuclear technologies. We are especially concerned by the large number of UK companies currently involved in both military and civilian nuclear technologies.[22] Autonomous robotics is particularly attractive to the military industrial sector, which raises serious human rights issues.[23] Meanwhile the potential future release of synthetic lifeforms raises profound health and environmental concerns.

In general, we are deeply concerned that the Green Paper reveals inadequate consideration of the social and environmental risks of new technologies. As SGR's own research has shown, the pressure on academics to work more closely with industry can undermine their independence and lead to bias in research, which could increase such risks.[24] Yet UK academics are also playing a leading role in the field of 'responsible innovation' which encourages timely risk analysis and consultation with stakeholders during the development of new technologies.[25] It is very disappointing that this latter field is not even mentioned.

3. Military industrial sector
(Questions: 1, 2, 5, 23, 24, 25)

The Green Paper includes an aim to further expand the UK's military industrial sector, and prioritise exports, despite all the ethical issues raised by these actions.

The government has been especially supportive of UK arms exports, with a marked expansion since 2010 – and Saudi Arabia being the largest recipient despite its very poor human rights record.[26] With that nation now leading military action in Yemen – and having been strongly criticised in a United Nations report for "widespread and systemic" attacks on

[22] Cox et al (2016). Understanding the Intensity of UK Policy Commitments to Nuclear Power. SPRU Working Paper Series, no.2016-16. University of Sussex. http://www.sussex.ac.uk/spru/documents/2016-16-swps-cox-et-al.pdf
[23] See, for example: International Committee for Robot Arms Control. http://icrac.net/
[24] Langley C, Parkinson S (2009). Science and the corporate agenda. SGR.
http://www.sgr.org.uk/publications/science-and-corporate-agenda
[25] See, for example: EPSRC – Framework for Responsible Innovation.
https://www.epsrc.ac.uk/research/framework/
[26] Campaign Against Arms Trade (2016). UK Arms Export Licences.
https://www.caat.org.uk/resources/export-licences

civilian targets in violation of international humanitarian law[27] – the government is under great pressure to suspend these sales. Yet not only does it refuse, in the Green Paper it plans further expansion. Furthermore, with Britain leaving the EU, the government is seeking expansion of arms exports to many other Middle Eastern nations as well. To put economic considerations above basic human rights sets a very poor example that will also very likely be detrimental to international security. Hence SGR strongly objects to these proposals.

The UK's current development of a new generation of nuclear-armed submarines also raises profound ethical issues. This is especially true as, despite claiming to support multilateral nuclear disarmament, the government is boycotting ongoing UN negotiations on a new treaty to ban these weapons of mass destruction.[28] Again, SGR strongly objects to the government's position.

The UK's current policy is to increase military R&D spending. According to the latest official figures, this spending had risen by 24% between 2011 and 2014.[29] Analysis by SGR has pointed out that R&D on nuclear weapons (including submarines and warheads) is the largest proportion of this spending.[30] Spending on remotely piloted aircraft systems – commonly known as 'armed drones' – is also high and growing. The Green Paper highlights the recently created Defence Innovation Initiative, which includes the creation of an £800 million, 10-year innovative procurement fund. SGR is deeply concerned by the strength of the political and economic support that the government provides to military science and technology. Our view is that any increases in public spending on R&D should be directed to civilian sectors, and that UK spending on military R&D should fall.

We strongly urge the government to recognise the evidence of the counter-productive nature of the UK's militarised approach to security problems – especially since the end of the Cold War – and hence end its preferential treatment of the UK arms industry. In analysing the militarisation of science and technology in the UK, SGR has summarised some of the evidence that Britain's focus on military responses has repeatedly fuelled the cycle of violence internationally, increasing national and international security threats.[31] Indeed, we point to the recognition within the government's own National Security Risk Assessment[32] that the most of security threats facing the country – and the wider world – cannot simply be countered with military force, and all would arguably benefit from a greater focus on

[27] The Guardian (2016). UN report into Saudi-led strikes in Yemen raises questions over UK role. January. https://www.theguardian.com/world/2016/jan/27/un-report-into-saudi-led-strikes-in-yemen-raises-questions-over-uk-role

[28] ICAN-UK (2017). Press release: States to Begin Negotiation of Treaty Outlawing Nuclear Weapons, UK Expected to Protest Outside the Conference. http://uk.icanw.org/campaign-news/pr-mar2017/

[29] Office for National Statistics (2016). UK government expenditure on science, engineering and technology, 2014. https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgovernmentexpenditureonscienceengineeringandtechnology/2014

[30] Scientists for Global Responsibility (2014). UK nuclear weapons R&D spending. http://www.sgr.org.uk/publications/uk-nuclear-weapons-rd-spending

[31] Parkinson S, Pace B, Webber P (2013). Offensive Insecurity: The role of science and technology in UK security strategies. SGR. http://www.sgr.org.uk/publications/offensive-insecurity

[32] Summary of the National Security Risk Assessment 2015. Annex A of: HM Government (2015). National Security Strategy and Strategic Defence and Security Review 2015. Cm 9161. HMSO.

efforts to tackle root causes such as economic inequality, climate change and other environmental problems. Again we point to the need to give greater priority across government to helping achieve the Sustainable Development Goals. Science, technology and industry are key in supporting these efforts, and SGR thinks their diversion towards fuelling arms races is quite simply a tragic waste of resources.

Some argue that government investment in the military industrial sector is justified on the grounds of maintaining UK employment in a high technology sector. However, recent research has pointed out that job losses that result from cuts in, for example, arms exports could be more than compensated for through expansion, for example, in the renewable energy sector. Indeed, there is a significant overlap in the technical skills used by both sectors.[33]

4. Corruption
(Questions: 1, 19, 24, 25, 26)

The Green Paper surprisingly fails to mention the issue of corruption. The £671m settlement[34] that Rolls Royce reached with British, American and Brazilian authorities in January over allegations of corruption and bribery in numerous military and civilian deals clearly demonstrates that this remains a serious issue. That such practices were allowed to continue over nearly 25 years in such a prestigious corporation casts a long shadow over UK industry. One should also not forget that in 2010 BAE Systems agreed a settlement of nearly $450m with the US and UK authorities, also over allegations of bribery.[35] Major foreign corporations which have a significant presence in the UK have also found themselves falling foul of law enforcement agencies internationally. Arguably, the most serious scandal was Volkswagen's use of 'defeat devices' to sidestep pollution regulations.

Hence, SGR's view is that the government's industrial strategy paper must outline robust measures for prevention, investigation and prosecution of wrong-doing to assure all those with whom the nation does business that this sort of behaviour will not be tolerated.

Contact:
Dr Stuart Parkinson
Scientists for Global Responsibility
Unit 2.8, Halton Mill, Mill Lane, Halton
Lancaster LA2 6ND
01524 812073

---

[33] Campaign Against Arms Trade (2014). Arms to Renewables: Work for the future. https://www.caat.org.uk/campaigns/arms-to-renewables/arms-to-renewables-background-briefing.pdf
[34] BBC (2017). Rolls-Royce apologises after £671m bribery settlement. January. http://www.bbc.co.uk/news/business-38644114
[35] Financial Times (2010). BAE to pay $450m to end bribery case. February. https://www.ft.com/content/8134d35a-126a-11df-8d73-00144feab49a