



24th September 2020

Prime Minister
10 Downing Street
London SW1A 2AA

Dear Prime Minister,

Learning from Lockdown to support the delivery of zero emissions

UK FIRES is a major Research Programme funded by BEIS through UKRI comprising six leading UK universities, a consortium of UK based industries and several policy advisors. We warmly welcome your initiative in creating the Climate Action Strategy Committee and the Climate Action Implementation Committee and look forward to seeing their vigorous activity in delivering the UK's leading and proper commitment to zero emissions by 2050.

Our report "Absolute Zero" published in November last year, the first description of the delivery of zero emissions in the UK with today's technologies, informed the Council of Science and Technology's letter to you earlier this year on whole systems and was the topic of a debate in the House of Lords on 6th February.

Since the beginning of March, the UK FIRES community has monitored the effects of Lockdown across UK Industry and Manufacturing and looked for new strategic opportunities arising from this unexpected period compatible with our analysis in Absolute Zero. We are therefore writing to offer five recommendations to support a more rapid and more resilient journey to zero emissions in 2050.

1. Create a Delivery Authority for Climate mitigation.

- The primary recommendation of Absolute Zero, reflected to you by the Council of Science and Technology, is that the government should create a Delivery Authority to guarantee compliance with the Climate Change Act. The tremendous London 2012 Olympics were delivered on time and on budget by such an authority, which adopted a principle of using no new technologies, to guarantee risk-free delivery.
- The Delivery Authority should be substantive and enduring, able to hold accountability for delivery across different governments and through to 2050. It must necessarily be an exemplar of the whole-systems approach recommended by CST in order to co-ordinate across the different departments charged with emissions responsibility in different sectors.

- It would further provide the essential focus to allow the UK to capitalise on the commercial opportunities created by its leading zero emissions commitment. Regulation on electric cars has led to a wave of innovation and growth potential, and as similar regulation is applied to space-heating, industrial processes, construction practices and other modes of transport, the UK will be well positioned to develop world-leading businesses compatible with a zero-emissions future.

2. Initiate a National Resilience Commission.

- During Lockdown, the UK's food supply chain performed well, but reconfiguring assets to produce ventilators took time, and it was difficult to manage the data flows required to allow private sector testing capacity to interface with the NHS.
- Progressive and potentially rapid unmitigated climate change will pose much wider threats to UK sourcing across many sectors including food, communications, energy, household goods and transportation. The requirements of mitigation will furthermore place a new stress on global resources, as patterns of demand change. For example, demand for the "e-tech" metals will soar with rapid global scaling of renewable generation and electrical storage.
- The government should create a National Resilience Commission reporting to the National Security Council. This would provide government with impartial, expert advice on the UK's resilience to disruption across the whole portfolio of imported goods and raw materials. It would identify the minimum manufacturing, distribution and material sourcing requirements that the UK must secure and plan for their rapid reconfiguration to ensure societal stability as climate or other crises inevitably arise.
- The commission could have similar form to the National Infrastructure Commission, and draw on expertise from the Armed Forces, the Catapults, Customs & Excise and other critical delivery bodies.

3. Update the green book to account properly for external risks.

- Government spending decisions over say twenty years prior to the pandemic were assessed as "cost-efficient" by the Treasury Green Book, but in retrospect, lockdown has cost us much more than if we had prepared differently.
- New risk-based metrics to assess government spending should be developed by a working group from the Treasury and the National Audit Office, with appropriate external input. These new metrics can be validated by comparing the actual costs of the COVID lockdown with scenarios of how we might have prepared differently. The required metrics must use discount rates appropriate to the timescales of risk and cover the probability of disruptive events.
- The new metrics should be incorporated in the Green Book and become a regular part of Treasury assessments of government spending, to support the Government's development of robust processes for delivering zero emissions.
- Such metrics will also be useful in assessing preparation for other external risks, including future pandemics and could be used also by the private sector.

4. Use post-Covid stimuli to grow skills and businesses compatible with zero emissions.

- Conventional economic stimuli in the construction of national infrastructure risk running counter to the UK's climate law, as evidenced by the Heathrow 3rd runway.

- The current operations of stranded fossil-dependent sectors such as oil and gas supply or aviation must by law end in the UK within 29 years, so must not be given any stimulus. Existing support must be withdrawn in line with a trajectory of closure.
- However, delivering zero emissions requires tremendous growth in other sectors. For example, the UK must achieve: at least a trebling of non-emitting electrical supply and distribution; extensive building reconfiguration, for example through vertical extensions and flexible-use, as cement production becomes illegal; non-emitting material supply for example, through renewably powered steel recycling; electrification of space heating in all UK buildings; energy retrofit (for insulation and air-tightness) of over twenty million dwellings.
- The government should use the post-lockdown stimulus to:
 - support capital investment to develop zero-emissions industry, such as the steel industry where transformation from the emitting blast-furnace past to the non-emitting electrical future is unachievable with the current cost of capital but could be enabled by long-term government guarantees of investment funding;
 - ensure new and existing spending commitments extract maximum value for the UK taxpayer through domestic procurement, including raw materials;
 - fund an expanded provision of further education in critical areas such as retrofitting buildings to zero emissions standards, and in installing and maintaining distributed generation, distribution and management of electricity;
 - fund large-scale demonstrators of new technologies that may contribute to a post-emissions UK and develop credible evidence-based predictions about the rate at which they can be deployed.

5. Plan for societal participation in mitigating climate change.

- For twenty years ahead of the Covid Pandemic, the UK was over-confident that it would develop the technologies to allow rapid vaccine development which could have solved the problem without societal participation. However, the technology was unready, and short of other preparations (such as the track, trace and isolate model being deployed now) we were forced into the severe societal disruption of Lockdown.
- By analogy, preparations for climate mitigation in the UK and elsewhere are over-reliant on new technologies such as CCUS, Negative Emissions Technologies or hydrogen storage, that have not yet reached market entry let alone maturity. This over-confidence in new technologies arises from a broad failure to recognise constraints on scalability and an unacknowledged mismatch between future demand for electricity and the available non-emitting supply.
- Meanwhile, and possibly as a result, we have given insufficient attention to more immediate mitigation options such as reducing car weights, planning for building longevity, or developing substitutes for long-distance travel for short business or personal visits. These options, which involve societal participation, can be deployed more rapidly and without them we will fail to meet the 2050 legal target.
- The government should embed societal participation in climate mitigation in its planning, policies and communications, in the national curriculum and in the design of the Delivery Authority.

- It should further ensure that independent scrutiny (for example by a standing parliamentary committee) can validate the robustness of its plans for mitigation accounting for scalability and whole-system effects.

Our analysis in “Absolute Zero” and ongoing work expands on these recommendations and we would be pleased to discuss them with you and your ministerial colleagues.

This letter is the outcome of work across the UK FIRES programme, with input from our industry partners including Atkins, Primetals, Anglo-American, Sky, the Material Processing Institute, Emerson, the High Value Manufacturing Catapult, our research group spanning academics in the departments of economics, management, engineering, manufacturing and data science at the Universities of Cambridge, Strathclyde, Nottingham, Oxford, Bath and Imperial College, and with support from our policy advisors, Lord Browne of Ladyton, Laura Sandys CBE and the Government Office for Science.

We are copying this letter to the Secretary of State for Business, Energy & Industrial Strategy, to the Secretary of State for the Department for Environment, Food and Rural Affairs and to the Government Chief Scientific Adviser. From next week, we plan to publish this letter and seek opportunities to share these recommendations with the media.

Yours sincerely,

A handwritten signature in blue ink that reads "Julian Allwood". The signature is written in a cursive style and is positioned above a horizontal blue line.

Professor Julian Allwood FEng

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