Coadec's Greenprint for a World Leading Climate-tech Ecosystem

Report 1: Green Foundations

Sowing the seeds for a green transformation of the UK economy powered by climate-tech startups

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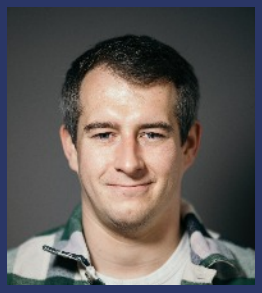

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About Coadec

The Coalition for a Digital Economy (Coadec) is an independent advocacy group that serves as the policy voice for Britain's technology-led startups and scale ups.

Coadec was founded in 2010 by Mike Butcher, Editor-at-Large of technology news publisher TechCrunch, and Jeff Lynn, Executive Chairman and Co-Founder of online investment platform Seedrs.

We fight for a policy environment that enables early-stage British tech companies to grow, scale and compete globally. We have over 3000 startups in our network and have been instrumental in building proactive coalitions of businesses and investors on issues that are integral to the health of the UK's startup ecosystem. Our work has seen many successes, from the establishment of the Future Fund and the expansion of the Tier 1 Exceptional Talent Visa, to the delivery of the UK's Patient Capital Fund.

We represent the startup community on the Government's Digital Economy Council, and the UK on the board of the international group, Allied for Startups.

Introduction

In November 2021, the UK hosted the largest ever gathering of foreign leaders this land has ever seen. COP26 marked the latest milestone for humanity's attempt to avoid catastrophic climate change that is "unequivocally" our fault. The most recent milestone before Glasgow was the 2016 Paris Agreement, which resulted in 191 countries committing to the objective of keeping global warming well below 2°C and preferably no more than 1.5°C. The 2021 Glasgow Climate Pact took another tentative step towards this goal, but with the planet projected to warm by 2.4°C under the latest national commitments, there is still much more to be done, and quickly.[1]

Amongst the Glasgow commitments to reducing methane emissions and deforestation, one narrative was consistent: countries all over the world are placing their faith in innovation. To avoid invasive and unpopular steps to curtail the lifestyles many in the developed world have today, we will need to invent, invest and innovate in new technologies on an unprecedented scale, including in the UK.

The industrial revolutions of the past required fossil fuels but the next must transition the global economy away from them.

> **"To avoid invasive and unpopular steps to curtail the lifestyles many in the developed world have today, we will need to invent, invest and innovate in new technologies on an unprecedented scale."**

In April 2021, the UK Government enshrined cutting emissions by 78% by 2035 in law, on route to its parallel legal obligation to achieve net zero emissions by 2050. The overarching plan to achieve this was defined in the Net Zero Strategy published in October 2021. Two things are clear from the strategy. Firstly, the Government recognises that innovation will be central to the net zero transition, particularly to mitigate the disruption to lifestyles that decarbonisation could bring. Secondly, net zero could present an economic opportunity for the UK, if done right. In parallel, the Committee on Climate Change has previously highlighted in its sixth carbon budget that consumer habits alone account for only 16% of the changes required in its "balanced pathway" net zero scenario. 41% completely require low carbon technologies and fuels with no significant shift in societal behaviour.[2]

The value of the UK's low carbon and renewable energy businesses' exports already exceeds £7bn today,[3] but the Department for Business, Energy and Industrial Strategy's (BEIS) Energy Innovation Needs Assessment (EINA) has calculated that the Net Zero transition could lead to a £60bn boost to the economy by 2050.[4]

> **"The UK Government recognises that innovation will be central to the Net Zero transition."**

Globally, the market for low carbon goods and services could be worth up to £1.8tn by 2030.[5] In its Net Zero strategy, the government also outlined how the Net Zero transition could also unlock up to 440,000 jobs by 2030; some of these could be provided by the next green unicorns, grown here in the UK.

Any approach to realizing this opportunity and reducing the net carbon emissions of the UK to zero in under thirty years will undoubtedly require investment, coordination and ingenuity. Some of the required technologies exist today, such as wind turbines, lithium batteries and cloud computing, while others are at a nascent stage and will require support to commercialise, such as tidal stream and carbon capture and storage. Others still will require the expertise and entrepreneurial spirit of one of the UK's greatest assets, its tech startup ecosystem. In particular, a range of startups known under the collective term of "climate-tech" hold the key to the UK's net zero future.

Climate-tech definition: startups offering products or services to solve the challenge of decarbonisation to mitigate the extent and impact of Climate Change this century. PWC has identified three types:[6]

- **Startups directly mitigating or removing emissions.**
- **Startups helping society to adapt to the impact of climate change.**
- **Startups enhancing our understanding of the climate.**

At Coadec we spend our time interacting with the most innovative tech startups in the UK, including those on the cutting edge of climate-tech. Our "Greenprint" is the culmination of months of discussions with stakeholders across the sector, distilling down steps that the Government can take to support climate-tech innovation and decarbonization by startups more generally. If these steps are taken, the potential of our climate-tech sector will be unleashed and the UK will be on its way to be the most attractive place in the world to found a climate-tech startup.

This report is the first part of our "Greenprint" for cultivating a world leading climate-tech ecosystem and sets out the foundations for climate-techs to thrive through the lens of Coadec's traditional three pillars:

- **Access to capital:** steps to unleash private and public sector investment in climate-tech startups
- **Access to skills and talent:** providing the right people and competencies that power climate innovation
- **Access to a favourable regulatory environment:** ensuring that the public sector is accessible and transparent to climate-techs

The Elephant in the Room: Accounting for GHG Emissions

One of the foundational barriers facing all firms, including those in the decarbonization sector and those outside seeking to decarbonise, is that in the absence of a market instrument to account for GHG emissions it is not necessarily economically optimal to emit less. The UK Emissions Trading Scheme (ETS), which launched in January 2021 as the post-Brexit successor to the European ETS, is the primary way in which the Government has sought to remedy this market inefficiency. This is a positive step, but it is important to recognise that in the absence of broader, cross-sectoral measures like a Carbon Tax, investment in decarbonisation, including in Climate-techs, will be stunted. With this in mind, this first contribution to the Greenprint operates under the status quo of limited GHG accounting.

Access to Finance

A critical priority for all startups, regardless of sector, is access to finance. Importantly, there is a necessary limit to the degree to which the Government can provide funding to support early stage businesses, to minimise risking taxpayer funds and to enable the market to function efficiently. Indeed, the private sector has stepped up it's investment in climate-techs in recent years, as firms prove that going green is good business, and climate concerns move up consumers' priorities.

Data from PWC's State of Climate Tech 2021 report found that $222bn was invested between 2013 and the first half of 2021, with a 210% growth in investment year on year. The average deal size nearly quadrupled in the year to H1 2021, while the number of global investors grew by over 50% year on year to around 2,500. After the Bay Area in California, London was the most active climate tech hub.[7] Dealroom and London and Partners found that in 2021 alone, global investors closed as many climate focused funds than in the preceding five years combined.[8]

The role of Government is, therefore, to continue to incentivise investment, whilst also providing support for the earliest stage, less commercially attractive, technologies, and providing certainty that climate innovation will be facilitated, accommodated, and prioritised going forward. Over the last few years the UK Government has taken a number of excellent steps to ensure a variety of reliable and robust sources of finance for startups, and support for investors, however there is always room for improvement.

Positive Steps Made So Far:

Expand R&D Tax Credits

Announced in the October 2021 Budget after two years of campaigning by Coadec, the expansion of research and development tax (R&D) credits to incorporate expenditure on datasets and cloud compute will be a boon for startups across the economy.

What this means for climate techs: many are data intensive, such as firms operating in decarbonising the built environment that require extensive data analysis to build solutions that efficiently heat and cool buildings, saving money and energy in the process. The Net Zero Research and Innovation Framework (NZRIF) outlined that the UK spends less money on clean energy research and innovation as a percentage of GDP than France, Canada and Japan.[9] Increasing the types of R&D spend eligible for tax relief will hopefully begin to erode away at this deficit.

> **"The expansion of research and development tax (R&D) credits to incorporate expenditure on datasets and cloud compute will be a boon for startups across the economy."**

As part of its monitoring of the impact of the changes to R&D tax credits, Coadec urges the Government to ensure it reviews the effectiveness of the relief in incentivising green R&D. Evidence collected by think tank Onward captured how the R&D intensity of many carbon intensive sectors, such as land transport (0.01%) and construction (0.09%), has remained low.[10] It is imperative

that R&D spend increase in these sectors as part of the net zero transition, and as advocated in many responses to the government's R&D tax relief review, measures to specifically promote R&D that enables decarbonization should remain on the table.

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Introduce the Long Term Asset Fund

In November 2021, the FCA introduced new Handbook rules and guidance on a new **"Long Term Asset Fund" (LTAF),**[11] a concept initially touted in the Productive Finance Working Group's recommendations in September 2021.[12] The intention of the new fund is to enable more investment in long-term, illiquid assets like startups.

What this means for climate techs: climate tech firms sometimes operate in relatively earlier stage technologies and thus require longer term investment horizons. Examples of technologies at an earlier stage of technological readiness level (TRL) include biochar production, cultivated meat, direct air capture, and novel battery storage. Firms developing these, and other early stage technologies, are prime investment targets for an LTAF. LTAFs are particularly targeted at direct contribution (DC) pension schemes and it is aspirational that the overlap between the LTAF design and the appropriateness of climate related investments will enable an accelerated 'greening' of pensions, whilst also opening up a significant source of capital to startups. This is aided by the increasing focus by pension providers on Environmental, Social, and Governance (ESG) factors, catalysed by campaigns such as Make My Money Matter.

Access to Innovation Grants

One avenue to capital that has been widely and successfully used so far is innovation grant funding, in large part through UK Research and Development's (UKRI) Industrial Strategy Challenge Fund (ISCF) and network of nine Catapults. Under plans set out in the Net Zero Strategy, the budget of the UKRI is set to increase by more than £1bn by April 2024, from its £6bn budget today.

What this means for climate-techs: the budget increase is welcome, but should be increased further, in line with the scale and urgency of the climate emergency. Evidence suggests that only 15% of applications for UKRI grants are successful.[13] In evidence to the House of Lords Science and Technology Select Committee in 2021, former head of Innovate UK Dr Ian Campbell suggested that increasing the overall budget to enable around 30% of applicants to be successful would support the UK's ambition to invest 2.4% of its GDP into R&D. This would also likely lead to increasing funding for climate-techs.

Our comment: Feedback from startups in our ecosystem also reports is that grant funding is a useful source of capital but that applications can be time intensive, with duplicate information required across applications. We would encourage UKRI and other grant administering entities to investigate ways to streamline the grant application process as startups have limited resources and time to devote to administration, particularly if they have already provided identical information elsewhere.

Next Steps:

Raise the Pension Charge Cap

The Government is set to consider a review of the Pension Charge Cap, currently set at 0.75% for defined contribution (DC) occupational pension schemes. The charge cap prohibits pension exposure to higher risk, but potentially higher reward investments like startups. This is because venture capital fees are significantly higher than passive asset classes with lower returns (equities) due to the costs of managing an unlisted portfolio of companies, which translates into a performance fee. Concerns around the additional risk should certainly be considered, and therefore the allocation of funds to high risk assets should be proportionate. A British Business Bank study has shown that allocating only 5% portfolio allocation in startup investments appropriately balances against the risks of investing - protecting retirement savings.

What this could mean for climate-techs: With assets in UK DC schemes expected to exceed £1 trillion by 2029, diverting just 5% of that to venture capital firms would equate to a £50bn funding boost for startups, including climate-techs.[14] Importantly, the FCA is also currently reviewing integrating environmental risks into non-workplace pensions, and the introduction of LTAFs will further enable guardrails around riskier investments, as outlined above. This creates a favourable backdrop to an increased pensions charge cap which would ultimately benefit climate-techs.

> **“Diverting just 5% of DC pension schemes to venture capital firms would equate to a £50bn funding boost for startups, including climate-techs.”**

Reform University Spinouts

“University Spinouts' typically refer to startups which have been founded by students or academics and often in an attempt to commercialise academic research. UK Universities approach spinouts in many different ways but, at their worst, the process founders are forced to go through can discourage further investment or otherwise fatally delay a startup’s route to market.

> **“9% of climate-tech startups spinout of universities, compared to 3% of other startups.”**

What this could mean for climate-techs: Commercialising academic research is one route into the UK’s startup ecosystem but one which a higher than average proportion of climate-techs (9%) relative to other startups (3%) typically utilise. Over the coming months Coadec will publish a paper outlining ways the Government could remedy some of the worst inadequacies, giving founding by spinout more of a chance at success.

Introduce the Advanced Research and Invention Agency (ARIA)

First touted in the March Budget and introduced to parliament a year later, ARIA is yet to take shape despite the Chancellor committing £800m of funding to it in the October 2021 Budget. ARIA will be the flagship of innovation strategy in the UK if it emulates the successes of the US Defense Advanced Research Projects Agency upon which it is based, but it must be delivered.

What this could mean for climate-techs: ARIA should be delivered with supporting innovation in climate-tech to accelerate the Net Zero transition as one of its core priorities, as was proposed by the Lords earlier in 2021.

Spotlight: Government Funding for Early Stage Climate-tech Startups

Decarbonizing our economy will require the developing and utilisation at scale of technologies at varying degrees of maturity. Some, like onshore wind and solar, have reached or surpassed price parity with conventional fossil fuels. The dramatic reduction in the levelized cost of electricity produced from these two technologies demonstrates that zero carbon renewable energy can be a price-competitive source. Beyond these two technologies, however, there is still some way to go for other critical net zero technologies to reach commercialization.

Early stage funding is an issue that goes beyond climate-tech, as captured by a 2021 Beauhurst report[15] that outlined how the absolute number of first round seed-stage equity deals, and the relative proportion of first round deals compared to second round seed-stage and beyond, have decreased since 2018. A thriving startup ecosystem relies on a glut of the earliest stage startups securing investment to ensure a sustained pipeline of firms going through the maturity cycle, meaning the trend is concerning.

It's not certain whether this decline also features for climate-techs in the UK but data from Pitchbook suggests that the amount of global investment in climate-tech firms invested at angel and seed rounds has also declined since 2018. Indeed, as a percentage of total amount invested in climate-techs, investment at angel and seed rounds reduced from 5% in 2011 to 0.3% in 2020.

Against this backdrop, one lever the Government has pulled so far is through contributing £20m towards the setting up of a VC fund dedicated to climate-tech investment. The tender was for a fund with a ten year term, including a five year investment period, making up to 20 investments of varying degrees of risk. In 2019, the tender was awarded to CGIM, a specialist investment management firm, and they launched the "Clean Growth Fund" (CGF) in May 2020.[16]

By January 2022 the CGF had reached £70 million and had invested 13% of this capital; a total of £ 8.9 million in five firms: Indra an electric vehicle infrastructure manufacturer, Piclo a software company specialising in electricity grid management, Carbon Re, a SaaS platform using AI to support manufacturing decarbonisation; tepeo, a producer of electric powered boilers and Holiferm a University of Manchester spinout that produces sustainable chemicals ingredients for personal and home care cleaning products.

The CGF is a good start, but it will be insufficient in plugging any early stage funding gap for climate-tech firms, particularly as some require longer time frames than 10 years. As the government advances with its efforts to support climate tech access to finance, it must be aware of the varying degrees of commercialisation in the sector. The short term return on investment must be balanced with the needs of under-invested technologies at a nascent stage.

Access to Talent

A perennial issue for innovative startups is the challenge of recruiting the right talent. Climate-techs are diverse, and the need for skilled employees spans across the sector, whether that is specialised software developers for the creation of an app to track and offset carbon, a data scientist to analyse smart energy use in a city utilising a digital twin, or a biologist cultivating your steak in a vat. This is not unique to climate-tech firms, however, and our ecosystem features many software intensive companies that are competing for a limited pool of technical experts. The net zero revolution and urgent need for green innovation will exacerbate the current dearth of skills and lay bare vulnerabilities in the pipeline.

Across the board, start-ups in our ecosystem report difficulty accessing talent. With the tech sector growing six times as fast as the rest of the economy, British tech startups and scaleups now employ 2.93m people, exhibiting 40% growth over the last two years, this represents a huge opportunity for the UK. Yet the necessary workforce is often underskilled and unavailable.

To support this need, the UK Government can support both the domestic and international provision of skills. In the UK, this means a curriculum and post-16 education and training programme centred around 21st century digital skills, and provision for lifelong learning for adults to enrich skills and re-train during the net zero transition. Internationally, this means an efficient and attractive visa scheme. On the latter, Coadec lobbied successfully for the post-Brexit scaleup visa, to be introduced in 2022, which allows scale-ups to take a fast-track route to hiring talent for roles paying over £33,000.

There is an additional growth area in terms of as-yet untapped talent: if we assume that the potential talent pool for future innovators spans across the UK population, this is not represented yet across all backgrounds. In 2017/2018, women studying computer science at A-Level made up just 13% of the total, despite a more equal representation across other STEM subjects.[17] Although this figure has increased since, this represents a significant opportunity, as does the underrepresentation in senior roles of those from BAME backgrounds.[15]

Beyond these high level areas, however, to support lifelong learning Coadec also advocates for the introduction of Future Earnings Agreements (FEAs), as identified in our previous paper "Finding a NEET Solution".[18] FEAs provide financing options for post-18 vocational training, inclusive of the coding bootcamps that can reskill adults into highly paid tech jobs, by allowing adults to take out a loan with a repayment plan based on their future earnings. Short-term vocational training providers are often able to offer a) greater specialism and b) greater adaptability to market requirements than catch-all university courses with the syllabus set at least three years in advance.

> **"FEAs provide financing options for training by allowing adults to take out a loan with a repayment plan based on their future earnings."**

The expansion of FEAs offers particular opportunities for Net Zero, an area of rapidly changing specialist technology.

Regional Climate-tech Ecosystems

Tech clusters are a subset of any innovation cluster where new technologies and inventions develop at an above-average rate as a result of intensity and proximity of ideas and talent, and are a vital part of both economic development and innovation. Examples of tech clusters include the Silicon Roundabout in London and Silicon Valley in the US, and the Cambridge-Oxford-London Golden Triangle for biology/life sciences.

The UK is an island with an extensive coastline and natural assets that give us unique opportunities to develop technologies and expertise that support the net zero transition. Emerging technologies such as offshore wind, wave power, tidal power, biological solutions including "blue carbon" capture, and the development of seaweed as an energy crop, carbon sink or food, are already being developed and have significant decarbonisation potential.

To stay ahead of the pack, the Government should explore cultivating specialist clusters to incubate and accelerate these technologies. Of TechNation's 2021 cohort of the Net Zero 2.0 programme of "the most exciting and innovative climate-tech trailblazers in the UK", 64% are based outside London, and all agri-tech and biotech in Oxford or Cambridge.[19]

Coadec welcomes items in the Net Zero Strategy that drive this agenda forward and the reference to "taking a place-based approach", particularly:

- The commitment of up to £102.5 million of funding through the Industrial Strategy Challenge Fund to "Prospering from the Energy Revolution", an innovation programme developing integrated smart local energy systems to deliver cleaner and cheaper energy services. Three projects are now underway in Oxford, rural Oxfordshire and Orkney, with a further ten places lined up.

"To stay ahead of the pack, the Government should explore cultivating specialist clusters to incubate and accelerate climate-tech technologies."

- The commitment of £3 million to the vision of a multi-modal hydrogen transport hub in Tees Valley and the aspiration of a future "hydrogen town".
- The creation of local Net Zero Hubs to support local net zero projects that can attract commercial investment.

Coadec notes the intersection of the opportunities offered by net zero tech and science and the government's agenda to level up opportunity across Britain: whether that is the use of seaweed as a potential bioenergy source, currently undertaken by the Sea Gas project in Redcar,[20] or offshore wind in the North-East, East Anglia and Scotland. Coastal towns on average experience slower employment growth and lower employment than the rest of the UK with coastal deprivation an observable phenomenon, yet their geography gives them a significant opportunity in relation to much of net zero tech.[21]

Our natural assets offer a head start in the race to win the net zero opportunity, whilst ensuring that net zero innovation is a critical means of levelling-up the UK.

The Net Zero Strategy references the opportunity for the UK's industrial heartlands, particularly positioning hydrogen train trials near blue hydrogen clusters,[22] and upskilling the local talent base, of engineers for example, into renewables through the use of Skills Bootcamps. Coadec backs the Strategy in the belief that this has the potential to be transformative, and the creation of "Super Places" in the North East, North West, Yorkshire and the Humber and Scotland and Wales can both provide a blueprint for industry and much-needed local value.

Coadec supports the trialling of projects like Super Places as a blueprint for future regional development. Coadec also supports the emphasis on regional specialisation and public-private sector partnership as a driver for encouragement of innovation and development of the UK's wider tech offering. Coadec will be bringing out a report later in 2021 highlighting how to help cultivate successful regional ecosystems for startups to thrive in.

Case study: Allia Future Business Centre, Cambridge

Allia Future Business Centre is a co-working and collaborative space based in Cambridge and Peterborough, offering a variety of memberships from co-working once a week to private offices, access to meeting rooms and shared spaces, or virtual packages offering start-ups an address and mail-handling service and access to meeting rooms.

Partnering with EIT Climate-KIC, an initiative funded by the European Institute of Innovation and Technology, the business centre runs a 6-month climate accelerator programme for pre-seed or seed stage local climate tech start-ups offering coaching, mentorship, peer-to-peer collaboration, workshops and an end-of-programme pitch day on a no-fee basis.

Access to a Favourable Regulatory Environment

Startups frequently struggle to interact with Government and regulators. This can hurt them but it can also hurt wider innovation. Bigger and entrenched incumbents, who can afford to devote time and resources to engaging Government and regulators on their chosen issues, will always attempt to box out startups. Indeed, this was the exact complaint made by climate-tech startups in response to COP26 itself, with Lubomila Jordanova of the carbon accounting startup, Plan A, quoted in a recent Sifted article saying: "greentech startups are not invited to the table on which the agenda is set... corporates seem the safer bet".[23]

Startups are vulnerable to the consequences of political and regulatory decisions and often lack the channels to communicate their concerns effectively early on in the process. Climate-tech often includes startups who are innovating with new materials, new forms of energy, whole new ways of doing things - or whose products otherwise need the input of several regulators and Government departments.

That startups have a high failure rate is baked-in, but the high instances that climate-tech need to interact with Government and regulators make them especially vulnerable.

Many climate-tech startups also operate knowing that, in order for them to scale, large sections of the economy or society will need to adapt to use their products. This will require large-scale coordination between Governmental departments.

Establish a Net Zero Innovation Directorate within the Cabinet Office

The Government's Net Zero Strategy details five entities with oversight over net zero policy, in addition to departmental specific remits. This includes two cabinet committees, one on Climate Action Strategy and another on Climate Action Implementation; a Net Zero Innovation Board; a cross-government Director General Group (originally established in 2019 to ensure a whole-of-Government approach to climate policy); and a No.10 Delivery Unit to ensure the Government focuses on its key priorities - one of which is delivering net zero.

We recommend that, sitting under the No.10 Delivery Unit, the Government creates a Net Zero Directorate within the Cabinet Office that can become an explicit place for climate-tech startups, both by acting as an entry-point for their interaction with Government and by joining up the net zero work of all other Government departments. We recommend it ensures each Department sets out clear priorities and responsibilities for their net zero actions, helping startups access the people they need in each department.

> **"We recommend that the Government creates a Net Zero Innovation Directorate within the Cabinet Office that can become an explicit entry pointplace for climate-tech startups."**

We also recommend that the new Net Zero Directorate sitting in the Cabinet Office operate an 'open door' for climate-tech. Initiatives such as 'office hours' really help startups, by enabling them to easily identify who to talk to and by giving them a place to communicate concerns and share their vision. An open door to startups should also help the Government avoid decisions that unintentionally hurt the sector. This would allow startups to feel part of the process and less like they are always playing catch up, trying to convince the government to reverse policies and regulations that would stifle innovation and restrict the UK's success in realising the opportunities of the net zero transition.

A Pro-Innovation Regulatory Framework

Startups are vulnerable to the consequences of political and regulatory decisions and often lack the channels to communicate their concerns effectively. When dealing with Government or regulators, one of the most frequent frustrations we encounter from startups is not being able to find business-critical information easily or quickly. Startups tend to have fewer resources to devote to the task, as well as tighter deadlines.

Common complaints from startups include: not knowing who to speak to, not being able to get in touch with a regulator quickly enough, not understanding the process and having to deal with regulators who lack technical knowledge.

The tech sector, particularly startups, are rapidly developing technologies that underpin a vast range of applications that will be critical in the future, such as those that smart infrastructure and transport are built on. To do this more effectively, the sector desperately needs regulators to adapt and evolve, with particular urgency in those sectors requiring transformation in the transition to Net Zero.

Post-Brexit, the UK possesses full autonomy over its regulatory regimes and with this, the opportunity to ambitiously reform how its regulators operate. We need a smarter approach to regulation, one that can better facilitate development and competition. The recent pace of development in emerging technologies has demonstrated that prescriptive regulation - a type of regime that effectively locks out innovation - is detrimental.

Given the rapid pace of development, an outcomes-focused regulatory approach, allowing industry to experiment with the means to comply with regulatory goals as long as they can credibly demonstrate those goals are met, would give the sector much-needed flexibility.

Regulators also need to give more support to the experimentation of new technologies. We need to make them easier to access. There has been a lot of commendable work in the financial sector after the UK's Financial Conduct authority created a regulatory sandbox where innovations could be trialled without having to meet usual stringent compliance requirements.

In a future report in our Greenprint for a world leading climate-tech ecosystem, we will discuss the merits of the adoption of sandboxes across the economy to accelerate

"Given the rapid pace of development, an outcomes-focused regulatory approach would give the sector much-needed flexibility."

climate-tech innovation, culminating in a cross-sector Net Zero Sandbox.

Additionally, recent action on the future of regulation from the Government has been welcomed. The new Regulatory Horizons Council, a body that has been tasked to identify technologies it expects to have the greatest impact on the economy, society and environment, should help drive innovation. It is important, however, to ensure that it does not exist solely to find new things to regulate.

The Government's requirement that all new regulatory proposals be assessed against an innovation test as part of their regular impact assessments has been welcomed by startups. We need to make sure this avoids becoming a perfunctory box-ticking exercise.

We also welcome the Government's proposals, in its data protection consultation, to ensure the Information Commissioner's Office (ICO) has a clearly defined and public strategy, with duties to support growth, innovation and competition, and clear metrics to measure its performance. For the startups that will create the UK's future economy, including emerging climate-tech firms that use AI and machine learning, the ICO has been, so far, the de facto regulator for their development.

Emerging technologies are also global in a way we have not had to deal with before. This means regulation that is to be effective needs more international cooperation and at earlier stages. In December 2020 the UK was one of the first nations to sign the Charter for the Agile Nations. The intergovernmental network aims to better foster global cooperation on regulations, and has been welcomed by industry. The founding six nations will aim to collaborate on regulatory experimentation giving rise to the prospect of a global sandbox that could allow tech startups to test their innovations in several countries simultaneously. This should also have knock on effects for being able to scale products quickly.

Spotlight: Food Standards Agency

In contrast to the rosy picture promoted in this report, many Governmental bodies do not serve the needs of startups and innovators. This is particularly concerning for sectors on the forefront of the net zero transition, particularly those whose regulators might not have traditionally had to deal with startups - such as in the case of food tech.

> **Unlocking food tech innovations on novel foods could contribute to the UK becoming more self-sustainable, alongside reducing the embedded emissions of our diets.**

Unlocking food tech innovations on novel foods could contribute to the UK becoming more self-sustainable, alongside reducing the embedded emissions of our diets: a study in 2021 found that food production constituted a third of total annual global GHG emissions.

Food-tech is an emerging sector that still suffers from high R&D costs across long time frames. Startups innovating in the sector have told us that their interactions with UK regulators and Government bodies are often frustrating and not designed with the needs of startups in mind. Issues, such as a lack of transparency from regulators and the lack of clarity in the approvals process, damage the appeal of food tech startups to investors. It also means European and US companies could get to market before UK companies.

This is in contrast to Singapore whose regulations are based on the UK's, as well as rigorous safety assessments, but which are nevertheless highly attuned to working with startups. Having been concerned about its food vulnerability, the Singapore government decided to focus on food-tech. It introduced a novel food regulatory framework in 2019. UK startups who have interacted with the regulator praised the ease of the process, being able to easily understand what was required of them when and being able to discuss their requirements with the regulator quickly - a stark contrast to the UK's own FSA.

Singapore is a trailblazer in this space, as manifested in the decision in December 2020 to become the first country in the world to allow the sale of meat developed from animal cell cultures. Though a nascent technology, when combined with renewable energy sources, cultivated meat has the potential to reduce the embedded footprint of meat, and thus be a part of the net zero transition.

Our Eight Foundations for a Thriving Climate-tech Ecosystem

Access to Finance

- HMT should review the **Pension Charge Cap** and ultimately raise the cap to facilitate additional institutional investment in startups.
- UKRI funding should increase, while the UKRI and other grant administering entities should investigate ways to streamline **the grant application process**.
- **ARIA should be delivered** with supporting innovation in climate-tech to accelerate **the Net Zero transition** being one of its core priorities, as was proposed by the Lords earlier in 2021.

Access to Talent and Skills

- The Government should explore the **introduction of Future Earnings Agreements**, including in enabling training for the net zero transition.
- Leveraging the Super Places project as a blueprint, **establish more regional climate-tech ecosystems** under public-private sector partnerships.

Access to a Favourable Regulatory Environment

- Establish a **Net Zero Innovation Directorate** within the Cabinet Office.
- **Embed innovation into Governmental bodies**, increasing transparency and accessibility to startups. An example of a Governmental body that should improve is the FSA.

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