

MAXIMISING IMPACT



AND COMPETITIVENESS

LAPFF RECOMMENDATIONS FOR
UK CLIMATE POLICY



Foreword

The Local Authority Pension Fund Forum (LAPFF) is a collaboration of public sector pensions funds (Local Government Pension Scheme) seeking to promote the highest standards of both corporate governance and corporate responsibility. LAPFF has engaged with many leading companies in the UK and overseas for many years on their climate change plans. However, through these engagements LAPFF has identified that without supportive policies, companies' actions may be limited. Therefore, it is appropriate to engage in the policy debate, from the perspective of long-term investors interested in reducing risks and strengthening growth and competitiveness.

2023 was the warmest year on record, and with continuing litany of high-profile climate disasters, climate action is needed now more than ever. Notably, COP28 called for countries to transition away from fossil fuels and for renewable energy capacity to triple by 2030.

The energy transition is made more challenging by the need for climate policy to be inclusive and recognise the needs of the most vulnerable – in a fair and just transition. However, the energy transition also creates real opportunities to enhance energy security, address energy affordability, and improve competitiveness and long-term economic growth.

This report therefore sets out LAPFF's key recommendations for climate policy in the UK, as the country moves to the next phase of its response to the energy transition. Given the extent and complexity of the energy transition, it cannot cover every aspect of climate policy, but the report aims to cover the most significant elements. It focuses on four key themes and technologies, and then considers climate policy at six key sectors in more detail.

Addressing climate change is one of the greatest challenges of our times. LAPFF is committed to helping facilitate the necessary transition as much as it can.

Doug McMurdo,
Chair Local Authority Pension Fund Forum

Contents

Foreword	2
Executive Summary.....	4
Introduction	6



Overview:

Climate and Energy – now and future



Key Themes and Technologies

Carbon Capture and Storage.	12
Hydrogen.....	12
Impacting emissions in the short term	13
A just transition.....	13



Sector reviews

Electricity	16
Housing and Heating.....	18
Road and Rail Transport.....	19
Industry	20
Agriculture	20
Finance and Corporate Governance.....	21

Conclusion.....	22
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Executive Summary

- The UK has achieved significant milestones in its response to climate change: coal use has largely been eliminated, renewable energy now accounts for a third of electricity production, overall emissions have halved, and electric vehicle use is growing rapidly. However, the next stage of addressing the energy transition will be more challenging.
- The new government are starting to outline their agenda. However, LAPFF has been concerned that some previous actions risked undermining the UK's international business reputation and the confidence of investors. These included the removal of key long-term targets, support for new fossil fuel projects, the mismanagement of the last offshore wind auction, and signs that the consensus on climate action is weakening. With stronger climate action being taken elsewhere, notably in the US and EU, the UK risks being seen as a far less attractive place for investment and its long-term competitiveness could suffer as a result.
- A particular concern has been that support can be too focused on expensive, slow to deploy solutions with considerable risks, which are unlikely to boost competitiveness and innovation – redeploying funds to areas such as training and genuine innovation are likely to be significantly cheaper and more effective.
- As an example of this, there has been a dependency on Carbon Capture and Storage (CCS), despite the consistent failure of CCS to achieve viable and cost-effective carbon reductions. LAPFF has found significant misinformation around CCS which has exaggerated its potential, undermining the credibility of UK strategy. Furthermore, CCS is profoundly anti-innovative as it disincentivises innovation in key sectors.
- Much support currently allocated to CCS should be redeployed to support innovation and deployment of genuine climate solutions in key industrial sectors: iron and steel, cement, chemicals, buildings, and agriculture, as well as the general electrification of industry.
- Hydrogen should be supported but only where it makes sense. Using hydrogen for home heating should be rejected as expensive and inefficient and instead it should be targeted at reducing emissions in key sectors such as iron and steel, chemicals, and aviation.
- Given the urgency of climate change there should be a special focus on short-term action to mitigate it, including addressing methane emissions, removing regulatory obstacles, and changing consumer behaviour.
- A just transition is essential, and many aspects of the transition have health and other benefits and will create many new employment opportunities. However, supporting innovation will be essential if the transition is to contribute to growth overall, and unfortunately the current focus does not achieve this. Training will be very important to build up capacity and ensure that those who need to can reskill.

Executive summary

SECTORS

- Decarbonisation of the electricity system has been a major UK success. However, challenges are changing as the grid decarbonises. Short term action to accelerate progress is needed, including expanding onshore wind and storage, and overcoming obstacles created by regulation.
- On domestic heating, progress needs to be accelerated urgently. Skills shortages make capacity building a priority, as is educating the public on heat pumps. Policy mechanisms targeting the upper end of the housing market and the rental market should be implemented to help drive the changes required.
- On transport, the Zero Emissions Vehicle mandate should be reviewed to ensure that non-electric vehicle sales are focused on affordability and the lower end of the market. Charging remains an issue, but the focus for support needs to shift to home and destination charging. The cost effectiveness of electric vehicles needs careful monitoring and potential support. Local authorities should be empowered and encouraged to support modal shifts, through the planning system and direct support.
- On agriculture, policy should support various short-term actions to improve emissions, but to start to achieve real change, the UK should consider product labelling to inform consumers of the carbon impact of their food.
- On finance, the UK's Green Finance ambitions are in serious jeopardy if the country is no longer leading the transition to net zero, and policy continues to be unpredictable and erratically implemented. Within the Green Finance agenda, transition plans need to be improved and made more relevant, and a robust UK taxonomy must be delivered promptly. Elsewhere, governance standards must be maintained and reforms to encourage risk capital should be considered.
- In combination these policies should ensure the UK remains at the forefront of climate action, while boosting UK competitiveness and long term growth and addressing energy security and affordability.

Introduction

The Local Authority Pension Fund Forum (LAPFF) is the leading voice for local authority pension funds in the UK. A collaboration of around 87 local authority pension funds together with seven pools, LAPFF works to protect over £350bn of local authority pensions by promoting the highest standards of corporate governance and corporate responsibility. Some issues, such as climate change, extend beyond the behaviour of individual companies to the way markets function. That is why we challenge regulators and seek to achieve reforms that advance corporate responsibility and responsible investment.

LAPFF has been engaging with companies on climate risk and their transition plans for many years and has seen a significant growth over the last few years in the number of companies considering climate change and developing transition plans – even if many of those plans need significant improvement. However, companies can only go so far on their own and so LAPFF also engages with government and policymakers to ensure policy is helping to address risks, create opportunities and provide incentives to change. In engagement with government, LAPFF is able to bring a unique perspective as a group of long-term investors, investing in businesses across the world and in different industries. Thus, LAPFF is familiar with good and bad policy and practice across the world, using these insights to inform its interventions. These activities are also strengthened by the LAPFF membership, as a cross party collaboration involving local councillors across the UK, with practical understanding of politics, regulation, and policy development. LAPFF seeks to base its recommendations on science and on solid evidence, seeking to be practical and realistic, while being bold in challenging poor practice and unsubstantiated claims.

As long-term investors, LAPFF members seek policies that reduce long-term risks and ensure economies remain competitive and able to support an acceptable return on our investments. The potential risks from climate change are so large that LAPFF believes a proactive approach is appropriate, investing in areas which help mitigate risks and encouraging companies to transition to a net zero economy. Key attributes of good policy which will help investors maximise the extent to which they are able to support an energy transition include the following:

- **Consistent: a long-term consistent policy framework enables investors and companies to plan ahead, allocate resources to areas in confidence and supports the development of businesses able to use our capital effectively.**
- **Financially material: market instruments such as charges for pollution and fiscal incentives need to be sufficient to impact risks and returns meaningfully. As fiduciary investors we cannot subsidise uneconomic investments but can help overcome market inertia and caution.**
- **Technologically realistic: meeting the climate change challenge will require new technologies. Policy should support this but should be balanced and neutral in its focus. In particular, it should avoid excess focus on technologies which have failed to make progress in the past or are speculative and unproven.**
- **Internationally competitive: there is an international market for capital, and investors and companies will allocate to those markets with the greatest potential.**

A further important aspect of the energy transition is the potential for it to be highly disruptive, including significant restructuring of key industries and the failure of some companies. This disruption should not be ignored, but it can be managed and minimised by recognising the potential for such change and making a broad, long-term assessment of the risks and likely changes. Policy needs therefore to be flexible within a consistent framework, and to be smart enough to adapt to new technologies as well as changing market circumstances. It should target support for green jobs and growth and those in society most affected or unable to adapt to the energy transition without help while avoiding subsidies for industries unwilling to change.

In this paper, it is not possible to cover every industry, technology or policy mechanism, so it is focused on some of the most significant themes and sectors. One of the key aspects of addressing climate change is the range of responses needed – there are no “silver bullets”. However, it covers the main sources of UK emissions, and the recommendations here would ensure substantial progress towards net zero. It does not consider climate adaptation: while recognising the growing direct risks of climate change and the need to adapt, the focus here is on ensuring the UK plays its part in stabilising the climate as soon as practically possible and gets back on track to achieve net zero by 2050.



OVERVIEW CLIMATE AND ENERGY – NOW AND FUTURE

Purple greenhouse lights are
innovative low energy warming lights,
Bleiswijk, The Netherlands



In the context of climate and fossil fuels, the UK energy mix can be described as one down, two to go. Significant progress has been made on eliminating coal from the energy mix. However, little progress has been made on reducing consumption of oil and gas, and so focusing on these will be key in the next stage of the energy transition. Oil is predominantly used in transport, while gas has significant use in heating, power generation and industry. As the graphic below shows, the near elimination of coal (in red) from the power generation mix was achieved between 2014 and 2020 by the rapid expansion of offshore wind (in green). This has resulted in the carbon intensity of electricity emissions falling by over half, to under 200g CO₂/kWh.

Fig 1. UK power generation mix 2009-2023

The graphic also shows that consumption of gas for power generation (and its associated emissions) have barely moved in recent years. The chart only considers power generation, the area where progress has been greatest. The following graphic from the Future Energy Scenarios prepared by the Electricity System Operator, part of the National Grid, shows overall energy mix in the UK in 2022, both in terms of supply and demand.

Fig 2. Energy Supply and Demand in 2022 (TWh)

The diagram shows clearly that of the 1763 TWh of energy supply in the UK in 2022, 82% comes from fossil fuels, with natural gas and other fuels (primarily oil) accounting for roughly 40% each. Low carbon electricity is only a relatively small section in the middle. In this context the progress made to date is only a modest part of the total challenge of getting to net zero. The five biggest consumers of fossil fuels are:

- Road and rail transport
- Domestic heating
- Industrial and commercial users
- Electricity generation
- Aviation and shipping

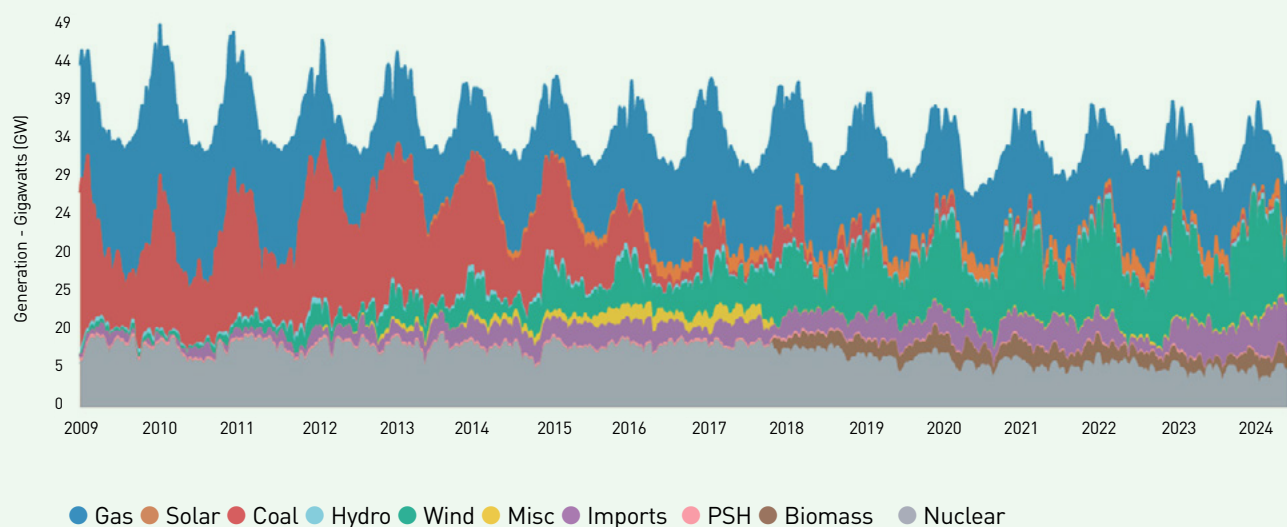
The future energy scenarios then look at four scenarios for meeting the UK's energy needs in 2050 compatible with net zero, showing how the energy mix might change. The graphic below shows the most progressive of these - "Leading the way".

Fig 3. Energy Supply and Demand in 2050: Leading the Way Scenario (TWh)

This scenario highlights a number of key points:

- This system becomes largely electric with electricity use rising 150%.
- Overall energy use has fallen sharply by 34% to 1167TWh because of increased efficiency – in particular, electric vehicles are much more efficient than internal combustion engines, and heat pumps deliver two to three times the heat per energy used compared to gas heating.
- Offshore wind electricity increases to eight times current levels (a growth rate of 7.7% a year). Solar and onshore also increase substantially.
- Hydrogen, primarily from low carbon electricity, is a significant part of the energy mix and is used mainly in industry and aviation.
- The scenario assumes the development of significant storage capacity, leading to a high degree of system flexibility (not shown).

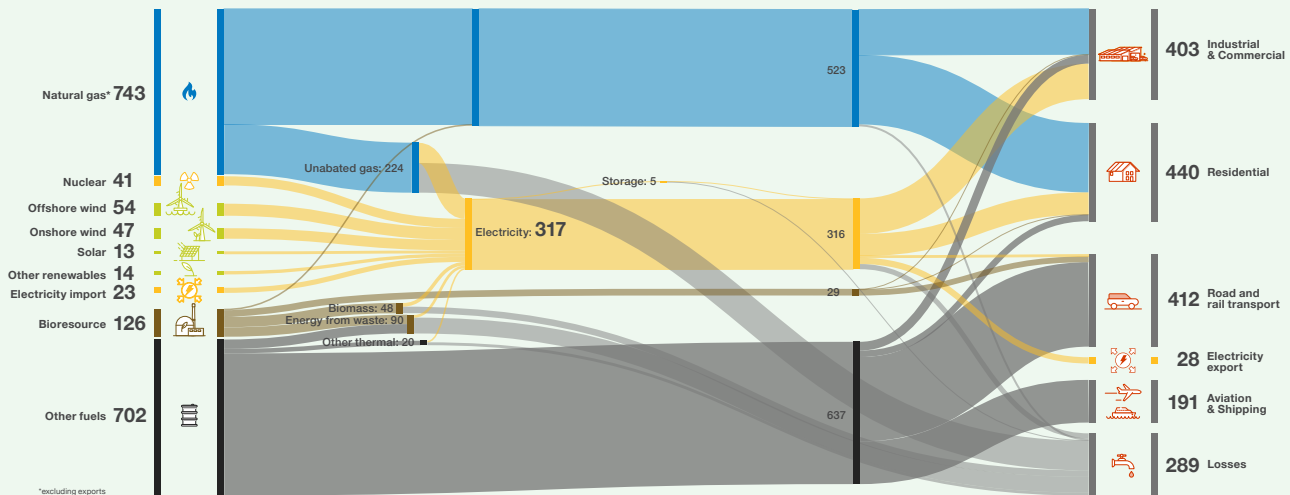
Fig. 1. UK power generation mix 2009-2023



Source: Energy Dashboard UK

Fig. 2. Energy supply and demand in 2022

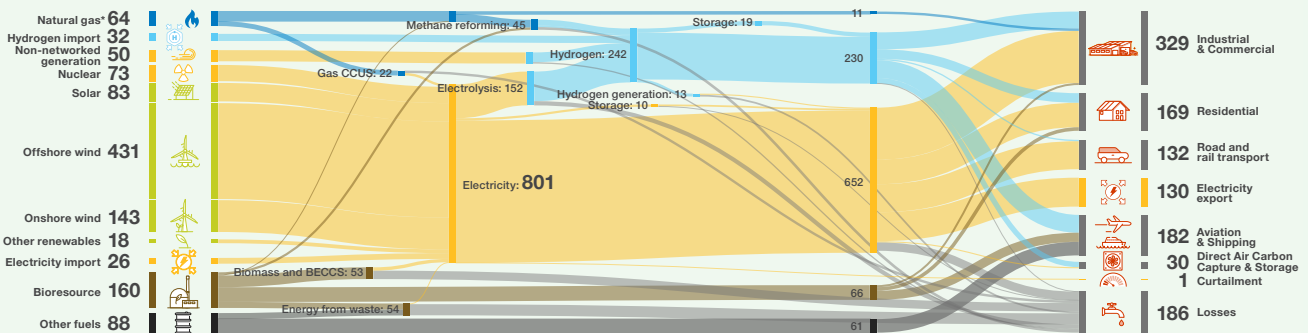
2022 (1763 TWh)



Source: Future Energy Scenarios ESO/National Grid

Fig. 3. Energy Supply and Demand in 2050

Leading the Way Scenario (TWh)



Source: Future Energy Scenarios 2023 ESO/National Grid

The scenario shows the extent of the transformation required. The other scenarios have a somewhat different mixture of fuels and assumption, but the core points above generally remain. Most significant is the dominant use of electricity and the growth in low carbon electricity generation, as well as the switch to an electric vehicle fleet.

To achieve this the UK has put in place an extensive policy framework. The Climate Change Act 2008 put 80% emission reduction targets into legislation, established the Climate Change Committee to advise the government, mandates the production of regular reports on key aspects, and establishes the use of intermediate targets and budgets. The Act made the UK the first country to legally mandate reductions in greenhouse gas emissions. In May 2019, Parliament approved a motion declaring a national climate change emergency, and later than year put into law

formal net zero targets. In December 2020, the then prime minister Boris Johnson committed to reduce UK territorial carbon emissions by 68% from 1990 to 2030, as part of the UK’s nationally determined contribution (NDC) to the Paris Agreement. In 2021, as part of the sixth carbon budget, a further target of 78% reduction by 2035 was put into law.

However, there was concern that progress had arguably stalled with the publication in April 2023 of the UK’s policy paper “Powering Up Britain.” These plans were seen by some as having significant shortcomings. For example, the Climate Change Committee in its report to Parliament in June 2023 identified policy gaps and significant delivery risks. Its assessment found that the UK was not on track to meet its targets for 2030.

There were further announcements regarding the exemptions or delays to the phase-out dates for

fossil-fuelled cars and boilers, and a decision not to regulate for improved energy efficiency of private rented homes. These changes were viewed as further undermining the country's ability to meet its climate targets. At the time, the Climate Change Committee stated that:

“We remain concerned about the likelihood of achieving the UK's future targets, especially the substantial policy gap to the UK's 2030 goal. Around a fifth of the required emissions reductions to 2030 are covered by plans that we assess as insufficient. Recent policy announcements were not accompanied by estimates of their effect on future emissions, Our position as a global leader on climate has come under renewed scrutiny following the Prime Minister's speech.”

As a result of these policy changes, the NGO Carbon Tracker, which assesses national climate policies, lowered its assessment of the UK's climate policy framework from almost sufficient to insufficient, implying policies were now more in line with 3 degrees of warming when they had been compatible with under 2 degrees. Its assessment of developments at the time stated that: “The current UK government

is wrecking the United Kingdom's long-held claims to climate leadership, making a series of U-turns on key climate policies, demonstrating chronic delays and a lack of vision in developing new policies, and actively undermining investor confidence in the country's commitment to climate action.”

While the new government has started to outline its approach to climate, LAPFF has shared concerns about previous policy developments, not just for their climate impact but also because they increase the risk of a disruptive transition in the UK, with the country losing competitiveness and business confidence falling, and the UK becoming a less attractive place to invest. As a result of the previous developments, long term risks increased, making it harder for LAPFF members to commit capital with confidence. To address these concerns, this document reviews climate policy in the UK, making recommendations for improvements to and strengthening of climate policies. We start by considering four key themes with impacts across many areas, and then look at policy for several key sectors, ending with green finance.



KEY THEMES AND TECHNOLOGIES

Energy transition should create a large number of new jobs



Carbon Capture and Storage

The UK's latest climate strategy relies extensively on Carbon Capture and Storage. The UK recently pledged significant funding for CCS, with £20bn set aside in the Spring Budget and plans to support 10 CCS projects by 2030, often highlighted for job creation potential.

Yet no other components of climate change mitigation have been less successful than CCS: while over the last 20 years wind and solar have gone from fairly small technologies to vast industries making a material difference to climate change, CCS has limped along from failed demonstrator project to unfeasible proposal. Indeed, it has only developed the credence it has through misinformation and exaggeration: e.g. projects touted as in advanced development have been long abandoned are still in development.¹ As of today, there are only 40 CCS plants in operation globally, with a total of 45 Mt CO₂/year. There are another 50 projects in some stage of development by 2030, but even with all of these becoming operational (which is unlikely) the pipeline is only sufficient to deliver a third of the contribution the IEA has envisaged for CCS by 2030 (310 Mt/year by 2030).²

The viability of many of the projects to date is highly questionable. LAPFF found of the 23 large scale CCS schemes already in place, 80% of them used captured CO₂ to extract oil, creating new emissions as fast as they remove them, but also this means the viability of them is dependent on fossil fuel activity. The process of operating CCS involves significant energy consumption in both extracting CO₂ (e.g. from exhausts) and storing it, and this needs to be accounted for in any estimate of net storage. Geology varies, making each project unique and making scaling up of CCS difficult. Further actual operation can vary from that expected, with evidence of unpredictability in subsurface conditions emerging in the Norwegian CCS plants often cited as model projects.³ Furthermore, the falling cost of renewables means cleaner energy is now often cheaper than fossil fuels (without CCS) and so the additional cost of CCS can only make fossil fuels less attractive relative to more sustainable alternatives.

CCS has been vigorously championed by certain sections of industry, notably the oil and gas sector, possibly because they view it as a potential source of revenue or at least as an excuse for inaction. However, given that those same companies have been

delaying action on climate change for many years and have failed to make any sort of meaningful transition to date, their recommendations may be more to do with preserving their business than helping the energy transition. To add to the injustice, substantial sums have been earmarked for supporting CCS, but given the oil and gas industry has made bumper profits recently, they should fund CCS themselves if it is so viable in supporting climate action.

The other significant criticism of the UK proposed reliance on **CCS is that it is profoundly anti-innovation**. LAPFF research finds that too many companies are essentially relying on CCS to deal with their carbon emissions, rather than innovating to eliminate emissions at source. The strong focus on CCS in the UK differs from many other countries, where it varies from being seen as one component among many, to largely irrelevant. With the latter, the focus is more on genuine long-term low-carbon solutions rather than essentially retrofitting expensive end of pipe solutions. LAPFF's engagement with international financial institutions particularly in Asia, has revealed widespread scepticism of CCS.

While LAPFF does not discount some potential use for CCS, UK Policy should be much more realistic about its potential to actually deliver and should be considering it more as a last resort than a first option for many sectors. It should be seen as an unproven technology and any support should ensure it meets key cost-benefit criteria. **The proposed allocation of £20bn to CCS represented a massive misallocation of resources and poor financial planning.** Much of the funding for CCS should be diverted to other areas, in particular electrification of industry, where it is likely to have a far greater impact, both in terms of mitigating climate change and revitalising the UK economy.

Hydrogen

The role of hydrogen is often misunderstood. It is not a source of energy in itself – it must be made using energy from other sources – but instead is a way of transporting, storing and using energy.

Hydrogen suffers from some key drawbacks. Making and using hydrogen inevitably involves some energy loss. It has low volumetric energy density, is difficult to liquefy (for compact storage), and prone to leakage. Leakage is relevant as, while hydrogen

¹ Data is often taken from the Global CCS Institute's 'database'. However, its category for CCS on coal plants "under advanced development" completely exaggerates the status. For example, there is a supposed 6MT/per year of CO₂ removal from "San Juan coal power station New Mexico". But in 2017 the State and the owners decided to replace it with solar and battery, and close in 2022. In 2021 a cooling tower fell down, the plant closed in Sept 2022 and the whole plant is now being dismantled. But the GCCSI still listed it in Jan 2023 as a project in advanced development. See for example <https://www.sitrib.com/renewable-energy/2023/01/18/can-carbon-capture-tech-extend/> "Enchant also last month ended its effort to buy the San Juan Generation Station, a coal-fired power plant in the Four Corners area that was shut down this year. Enchant wanted to install its carbon-capture technology and keep burning coal at the plant. So the GCCSI carried on stating the plant was in progress in 2020, 2021, 2022 and 2023 when it should have known from 2017 that the project was unlikely to proceed.

² [Carbon Capture, Utilisation and Storage - Energy System - IEA](#)

³ [Norway's carbon capture and storage projects augur geological risks in global aspirations to bury carbon dioxide | IEEFA](#)
[Norway's carbon capture and storage projects augur geological risks in global aspirations to bury carbon dioxide | IEEFA](#)

combustion does not emit CO₂ into the atmosphere, leaked hydrogen does contribute to global warming (primarily by reducing the breakdown of methane) – with a global warming potential of roughly half that of methane. As it has to be made from other sources, it is unlikely to be a low-cost source of energy.

Hydrogen has been advocated as a substitute for gas in industrial and domestic heating, for power generation and for various industrial processes. However, its potential is often overstated.

These issues mean that the **government should now reject hydrogen use for domestic heating** (and cooking). Using “green” hydrogen made from renewable energy for heating is energy inefficient as each unit of renewable energy will provide a little under one unit of heat via hydrogen, while it can provide two to three units of heat energy if used to power a heat pump. Using “blue” hydrogen made from fossil fuels with robust and credible CCS seems extremely implausible: CCS is highly unlikely to be available at sufficient scale and the very low cost needed to make this a viable option. The potential global warming impact of hydrogen leakage from domestic supply will also mean significant climate impact will still result. Given this, imposing a hydrogen levy on domestic energy use would be especially inappropriate. The National Infrastructure Commission, in its recently published Second National Infrastructure Assessment agrees unequivocally, stating:

“Based on the Commission’s assessment of the evidence, there is no public policy case for hydrogen to be used to heat individual homes or other buildings. Government should therefore rule out supporting its deployment.”⁴

Hydrogen still has an important role to play where its particular properties provide an advantage. Using it in steel-making to reduce iron ore is looking like a viable route to green steel. In chemicals, its various uses could be further expanded, as well as potentially providing high grade heat. In heavy transport, hydrogen directly or indirectly via other fuels may provide an effective solution as long as leakage can be contained. **LAPFF believes support for hydrogen should continue but needs focusing on those areas where it can make a genuine sustainable difference.** In addition, some of the extensive financial support announced for hydrogen is likely to be better redirected elsewhere within industry.

Impacting emissions in the short term

Given the growing risks from climate change it is worth prioritising actions which can have a short-term impact on reducing emissions – emissions reduction now helps buy time for longer term solutions to be developed and deployed. However, policy over recent years has appeared to emphasise long-term solutions, with uncertain economics and climate impact (most obviously CCS and nuclear).

LAPFF considers there is a good case for an explicit focus on short-term emission reductions opportunities in UK climate policy, with priorities and appropriate actions identified. It might well be worth considering a special taskforce or agency, with the funding and power to act in areas where emissions can be mitigated in the short term. Examples of short-term action include:

In methane emissions, which have a big short-term impact and have widely been acknowledged as an area for short-term action, with the UK signing up to the Global Methane Pledge.⁵ Tackling methane emissions in key industries as a priority makes sense – cost effective emissions reduction in the oil and gas sector are extensive, methane emissions from waste could be further reduced and in agriculture there are worthwhile options to reduce methane emissions from livestock and slurry.

In power generation, there is significant scope to accelerate renewable energy uptake, with notable potential for very low-cost power from onshore wind, and growing interest in storage to stabilise power – renewable energy can be deployed quickly if given the chance. Removing the obstacles to renewable energy deployment, notably in terms of grid connection and planning, could help unleash material amounts of low carbon energy.

In reducing consumption of high impact products, which immediately helps bring down emissions. Examples include: looking at ways to minimise the use of cement in construction, or encouraging the update of low carbon diets. Information and communication could play a key role here.

A Just Transition

LAPFF considers that a just transition is absolutely essential, both globally and nationally, and at a company level. As the UK transitions to a low carbon economy, the country should avoid imposing unfair costs and burdens on those least able to bear them. However, a just transition does not mean slowing or delaying the move to net zero – the least just transition is no transition – but rather designing and adapting policy to ensure adverse impacts on people and communities are managed and minimised. Without policy intervention the energy transition

⁴ Second National Infrastructure Assessment, National Infrastructure Commission. 18 October 2023. <https://nic.org.uk/studies-reports/national-infrastructure-assessment/second-nia/>

⁵ [Homepage | Global Methane Pledge](#)

is likely to be highly disruptive, but appropriate intervention targeting people most at risk of negative impacts. However, this should not be an excuse for general “corporate welfare” or avoiding change. If improvements are not made, the skills gap will widen social inequality and also leave behind lower-income people unable to afford new technologies.

Fortunately, there are many opportunities from moving to a low carbon economy to deliver broader benefits.

A low carbon society offers numerous health benefits from reduced pollution as transport becomes electrified and fossil fuel use declines, improved diets as consumers move to a better-balanced diet, and better health from improved housing.

Moving to local renewable sources of power offers increased energy security and more stable energy prices, from reduced exposure to volatile global oil prices. Done well, costs should be reduced overall in the long run.

Overall, the transition to a low carbon economy is likely to create a great number of good quality jobs, while also having a positive impact on UK trade and competitiveness through lower energy imports.

However, there are some areas which need managing from a just transition perspective and LAPFF believes these should be a policy priority for the government.

On employment, the energy transition should create a large number of new jobs. However, in other areas, jobs will be reduced or replaced. Ensuring this does not create injustice involves supporting adequate training and reskilling to ensure that those affected by job losses are able to find employment as the UK transitions. Current plans to support training and reskilling appear inadequate and need to be expanded. Skill shortages of engineers and key

skilled workers risk significantly delaying climate action.

Maximising the overall economic impact will partly depend on the level of innovation fostered by the transition plan. Indeed, innovation features highly in government policy. However, as discussed above, the current UK climate policy scores very poorly on support for innovation, focusing on large scale projects with poor economics, which in practice undermine the need for innovation in industry, while failing to adequately support innovation elsewhere. Furthermore, while basic research is well funded, the UK has a poor track record in supporting deployment and commercialisation of new technologies, and so mechanisms to support technology through to full commercialisation should be implemented.

On costs, particularly the cost of electricity, the current approach can be unjust and fall disproportionately on low-income households who spend a greater amount of their income on energy. This is due to the current system using a levy on consumers to fund transition in the power sector. This is done partly to keep the costs “off balance” sheet in terms of public spending. However, this is regressive, and the levy itself has been increased because of strategic choices which often do not reflect the needs of lower income households (notably blocking low-cost onshore wind and support for high cost nuclear, with hydrogen potentially to come). In addition, power prices can be unduly influenced by marginal costs, while much of it is contracted, leading to high price swings for consumers and excess profits for some developers. Improving the power pricing system and reducing the exposure of consumers to levies at least on basic power consumption levels, would appear appropriate.



SECTOR REVIEWS

Energy Performance Certificates need reform to make them more precise and realistic as at present they are all too often misleading and inaccurate



Electricity

The UK can be rightly proud of the progress that has been made on decarbonising energy supply, with a massive increase of large-scale offshore wind.⁶ By the end of 2022, offshore wind capacity was 13.7GW, up from 5.1GW in 2016, with 6.7GW under construction. There are now 44 wind farms in UK waters, with another six under development. Coal use has been massively reduced and carbon intensity of UK power has fallen by over 50%. However, electricity now faces a new phase with new challenges: increasing overall capacity and adding material amounts of storage to replace the flexibility of gas power.

Fig. 4. Offshore wind power generated to meet

electricity needs of UK homes

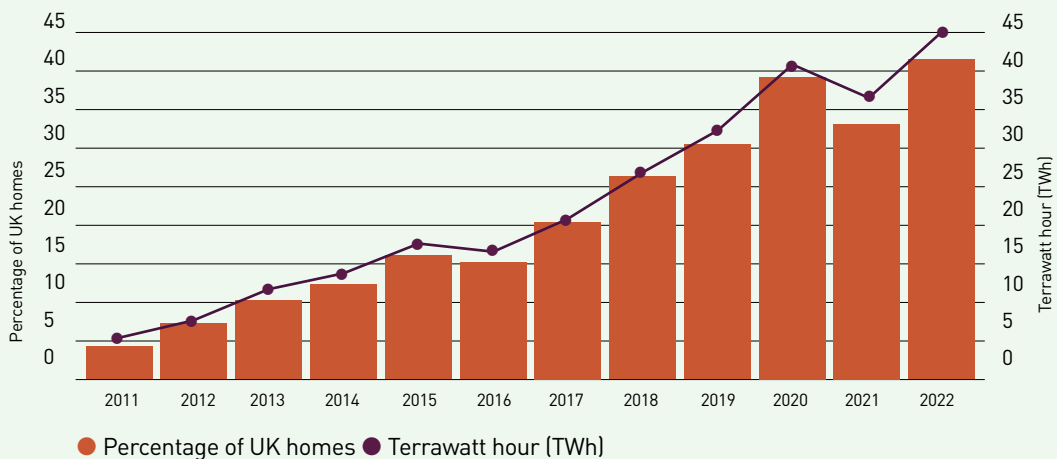
To identify the challenges going forward it is worth looking at the power generation over the short-term. The graphic below shows the generation mix over two weeks in September this year.

Fig. 5. Energy mix

From this graph, the following can be seen:

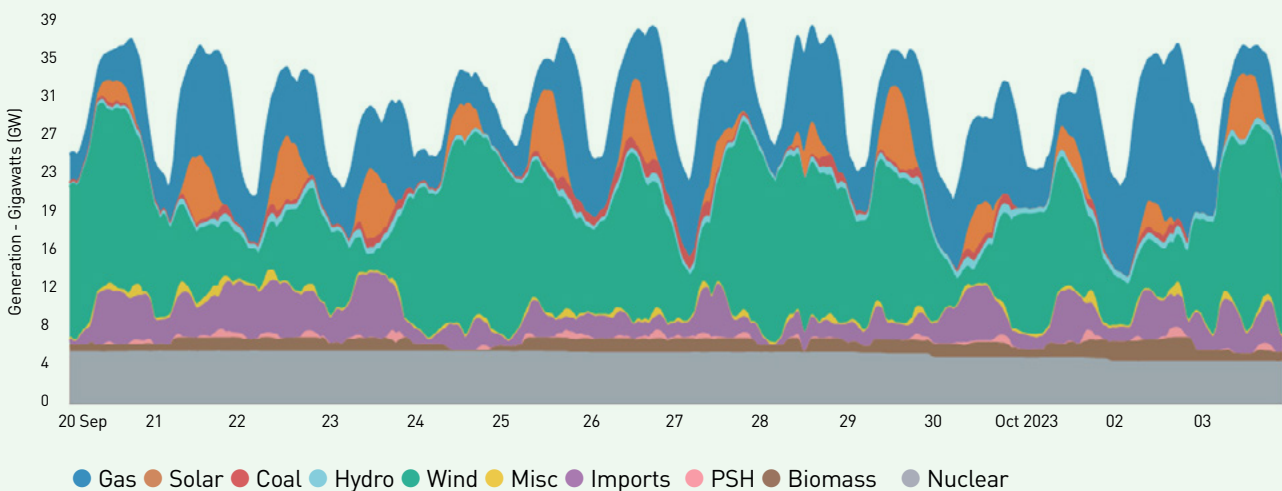
- The power mix overall is complex and very dynamic.
- Wind (in green) is a large part of the energy mix, and is very variable, typically over a time frame of a few days. Managing the periods where wind generation is low for a few days is the key challenge for a low carbon power system.

Fig. 4. Offshore wind power generated to meet electricity needs of UK homes



Source: Crown Estate 2022

Fig. 5. Energy mix



Source: Energy Dashboard UK

6 <https://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/energy/offshore-wind-report-2022/>

- **Solar (in orange) has a fairly predictable pattern, which coincides well with the daily demand peak, although the amount of generation varies.**
- **Currently, gas (in blue) is still the marginal supplier of power. This means that saving electricity will always reduce carbon emissions at present.**

The graphic shows there is scope to increase generation from renewables in the short term without having the problem of power generation exceeding demand, leading to wasted power (or “curtailment”) – by around 5-7GW for wind, and almost as much for solar (note they tend not overlap that much) - much of this is under construction. Getting to this point will be a significant milestone as it means the UK will start to have periods of zero carbon electricity.

However, once renewable energy grows significantly beyond current levels, new challenges will emerge to ensure resilience and grid stability while minimising energy wastage through curtailment. Addressing this will require new tools: storage, exports and demand management. The number of international interconnectors has expanded recently. They have been used more for imports, but as cheap wind power expands, they will be used more to export surplus power. Demand management has the potential to provide short term relief to the grid particularly as the grid gets smarter, and may be relevant for new areas of demand such as producing green hydrogen. Storage has only a small impact on the grid at the moment but will need to expand massively to the point where it can provide a significant proportion of electricity demand. There are several types of storage possible, with a particular need for large low-cost storage able to store energy for a few days as wind expands. Another aspect of storage is end-user storage, with vehicle to grid power (using vehicles to power the grid) of particular interest as the capital investment has already been made. Policy action is needed here to exploit this.

In addition, the grid will need to be expanded to ensure it has the capacity to meet the power needs of electric vehicles and heat pumps. Matching this increased demand with increased capacity will involve careful planning. Such planning will need to ensure the electricity system has adequate capacity without needing to resort to high carbon energy and supply isn’t added without adequate demand.

The market is responding to the challenge – total clean power projects in the pipeline total several times the UK current power capacity, with dramatic growth in the number of storage projects.

However, this potential for growth is not being realised as well as it could be. Inflation and rising interest rates are affecting the economics of many of the projects. A more significant problem lies with

governmental responses, which are often inflexible and unresponsive to changing market dynamics and challenges. The failure of the recent offshore wind auction was indicative of this: with warnings ignored regarding setting the maximum price it would pay too low, and with the result that there were no viable projects. This has caused significant damage to the UK’s reputation as a good place to develop renewable energy. Instead, the current energy policy appears to be focusing on longer term, more speculative areas rather than exploiting the potential of proven areas.

Another key issue is delays in connecting to the grid. Many infrastructure investors and developers cite this as the most significant problem, restricting development and not access to capital, planning regulations, or weak supply chains. National Grid in turn has recently published a paper⁷ identifying five priorities that require action by the government and regulators: planning system reform; updating governance frameworks; transforming the connections process; placing communities and consumers at the forefront of the transition; and, finally, investing in supply chain capacity and green skills need to be invested in across the country.

The cost of energy has recently become a key issue. It is therefore inconsistent that the UK has failed to exploit a major source of low cost, low carbon electricity with onshore wind energy. While this is a sensitive area of policy, removing excessive planning restrictions on wind power, and empowering and encouraging local authorities to allow appropriate local wind projects, could reduce electricity costs and provide a rapid short-term boost to decarbonising the UK economy. Some action has been taken but so far has failed to deliver significant growth in on shore wind, so more is needed. A target for building up onshore wind capacity over the next few years would appear appropriate.

In contrast, nuclear power is high cost but has in recent years featured heavily in government plans, including further expansion. LAPFF has some reservations about this on economic and time scale grounds. The cost of nuclear power is significantly higher than the electricity generated from renewable resources and remains higher even once some storage is included with renewables. Costs will rise significantly for new nuclear projects once higher interest rates are factored in. Indeed, the cost of nuclear may get more expensive relative to other technologies if past performance is any guide. Much is made of the baseload power capacity of nuclear, but in a system where there is lots of cheap but variable electricity, the real need is for flexible power generation to manage mismatches between supply and demand. The financial cost of nuclear power should not be buried in a green levy charged to consumers, which risks discrediting other technologies, but should be explicit.

7 <https://www.nationalgrid.com/document/149496/download>

The timescales of nuclear are a significant drawback – well over a decade to design, permit and build a project, so new nuclear power is unlikely to come on stream before 2035. With an urgent need for carbon reductions, near term other options are far quicker. Another less well publicised problem with nuclear is the potential to exacerbate skill shortages, particularly among engineers. Without action to address this, current expansion plans for nuclear look unrealistic and the delivery of other infrastructure projects could also be significantly impacted.

LAPFF believes reform and action is needed urgently in the electricity sector to ensure that further progress is made, and the power networks can meet the demands of net zero.

The process for connecting to the grid needs urgent streamlining and updating, with the ability to prioritise projects that are ready to proceed and strategically important. Targets should be set to ensure that grid connectivity is not an issue going forward.

Onshore wind should be significantly expanded, with appropriate local controls, to provide rapid boost to capacity. Targets should be set for this, and reaching a point where electricity generation is zero carbon for at least a proportion of the time.

Communities need to be involved in the energy transition, and local authorities are best placed to deliver this. Planning reform to enable local authorities to implement green energy plans and remove unnecessary restrictions on decarbonising power would be welcome.

The needs of consumers for affordable power must be prioritised. As discussed above, levies imposed on consumers must both be just and justifiable. The idea of targeting levies on the fossil fuel use (gas) and high consumption users rather than all electricity users should be accelerated. The power market also needs careful monitoring and development to ensure it is stable and fair and does not enable speculation or windfall profits.

Action is needed to improve training, skills and strengthening the supply chain, particularly as the power market gets more sophisticated. Targets should focus on building up capacity and sustainable businesses, not on simple headline numbers of installations.

Housing and Heating

Housing remains a significant source of carbon emissions, notably from heating where natural gas is the dominant source and is perhaps the most problematic major source of emissions. Action to date has largely focused on energy efficiency, which is important but insufficient by itself. Even here the take up has been poor. To deliver low carbon heating, the way we heat our homes needs to change to use

electric heat pumps (hydrogen is not a sensible option as discussed earlier). These can already deliver as much as three times the energy as the electric power they consume, with possible improvements to come. 19 million homes in the UK will need to have a heat pump installed to reach 2050 targets.⁸

This is a key low carbon technology where the UK needs to make improvements, being one of the slowest adopters of heat pumps in Europe⁹. Uptake is pitiful in the UK compared to other markets, with only 59,900 heat pumps installed in the UK last year. Recent policy has indicated it would like to increase this number to 600,000 installations per year by 2028. Recently it increased the support available to install heat pumps but has also abandoned plans to phase out installations of new gas boilers, sending very mixed messages to the market.

The key challenges with accelerating the uptake of heat pumps are the upfront cost, lack of installation expertise, and significant negative publicity around heat pumps from certain media outlets. As mentioned, there has been increased financial support for new installations, but to meet targets there needs to be action to improve installation expertise and capacity, and to improve public perception through a public information campaign. Quality standards may help reduce the risk of rogue installers. Longer term, with volume and technological innovation, it should be possible to reduce costs significantly and some direct support may be merited here.

Energy efficiency is important in its own right but also to make the uptake of heat pumps cost effective. There are also real issues of capacity and expertise here. For new buildings, the latest building regulations are demanding and close to the net zero house, but these only affect a small proportion of the housing stock. Upgrading existing homes needs much greater focus in government policy. To make a reasonable difference and materially improve the housing stock by 2050, bold targets for energy efficiency refurbishment should be set along with heat pumps and should rapidly rise towards a million homes a year.

There should also be expanded direct financial support for areas such as housing associations and public housing, where there is a clear dual benefit in terms of reducing energy poverty as well as reducing emissions – it can also be used to build up capacity. In the private rental market, the decision to postpone minimum efficiency standards was a retrograde step and very much at odds with a just transition – those in private rented accommodation are unlikely to be as wealthy as their landlords. Further consideration should be given to mechanisms to improve energy efficiency, possibly linked with other reforms of the private rented market. It is important that action to boost energy efficiency does not adversely impact

⁸ Committee on Climate Change (CCC), 2019. Net Zero Technical Report. London.

⁹ European Heat Pump Association

housing affordability.

A key area to focus on in the short term should be the top end of the housing market as affordability arguments are far less relevant (if you own a million-pound house you can surely afford to install a heat pump and improve your home's efficiency). Targeting the top end would help increase capacity and product development, making it easier for others to follow, as well as improve the image of energy efficiency. While a politically sensitive area, the government should consider how it could use revenue neutral market mechanisms to promote change while not negatively impacting people's housing aspirations. For instance, how stamp duty bandings could integrate energy performance so sellers would have an incentive to make their house more efficient. Buyers could be offered a partial rebate if they carry out energy efficiency work.

Supporting actions are also important in housing. While fundamentally a good idea, Energy Performance Certificates (EPCs) need reform to make them more precise and realistic as at present they are all too often misleading and inaccurate. They should be an effective gateway to action on energy efficiency. Again, there is scope for supporting innovation and new technologies in areas such as heat storage (phase change materials), new insulation materials (and more efficient application) and improved glazing. Reform of the planning system should enable local authorities to include more aspects of low energy use in permitted development.

However, to reiterate, the biggest issue is training and capacity building, which is urgently needed if housing is to be upgraded successfully at scale. The construction industry needs to improve its skills base to support net zero. Specific issues are low wages for apprenticeships, inconsistencies in quality training and lack of routes into the sector.¹⁰ Upgrading housing to best practice is a complex and technical area. To illustrate, currently installing a combination boiler is less complex than installing a heat pump, which needs a detailed understanding of insulation, thermal capacities and more complex plumbing. A fully integrated system may also involve understanding power storage and photovoltaics. Previous initiatives have often floundered or faced backlash as demand has exceeded capacity and a lack of expertise has led to poor installations. However, the need for capacity is also an opportunity to create new high-quality jobs.

Road and Rail Transport

Change is clearly happening in the transport market, particularly with a rapid uptake of electric vehicles.¹¹ However, despite this encouraging progress there are

concerns about the longer-term replacement of the car fleet, and whether the more reluctant motorist will switch without a robust policy framework. Oil consumption and the level of emissions will only fall with a significant lag as electric vehicle sales grow, given the average age of the car fleet is around 10 years.¹²

However, the policy framework did take a step back with the decision to delay the ban of petrol and diesel vehicles to 2035. Nonetheless, the Zero Emission Vehicle mandate introduced by the previous government and which states the proportion of electric vehicles to be delivered each year, provides a powerful incentive to roll out electric vehicles to meet the targets. However, there does appear to be a problem – given the profitability of larger vehicles and nature of the ZEV mandate, there is a stronger incentive to continue to sell premium fossil fuelled vehicles compared to cheap cars, at odds with the supposed reason for delaying the phase out to 2035, which was about affordability.

To ensure the UK meets its net zero target, there is a strong case for reviewing the decision to delay the phase out of fossil fuelled cars and bring it back to at least 2032 if not 2030. There is also a case for reviewing the incentives structures to ensure the premium car fleet moves first to become all electric and the remaining petrol cars sold are at the lower cost end of the market. This would help in terms of affordability and a just transition. In the longer term, it will also be worth considering measures to accelerate the decarbonisation of the remaining car fleet, such as a scrappage scheme.

Furthermore, the economics of electric vehicles need careful monitoring and, potentially, action. The financial case for electric vehicle is not that strong and if the economics falter it could result demand faltering or even a backlash against electric vehicles. Supporting access to low-cost charging may be critical – using night rate domestic power is cheapest but only works for those with off street parking. Support for the charging network remains important, but the shift may be needed to focus on access to charging for those without off street parking (such as lamppost chargers), as well as destination parking (at places such as hotels and visitor attractions). As discussed above, avoiding excessively inflating electricity costs through levies would help, as would ensuring petrol costs fully reflect environmental costs.

Finally, encouraging alternative forms of transport “modal switching”, particularly in urban areas, is really important – buses, local rail, micromobility (electric bikes, scooters etc.) can all play a part. Net zero is unlikely to be achieved through vehicle electrification alone. Improving the convenience of alternative modes of transport is key. Local authorities need more power to develop and implement

¹⁰ [The Installer Skills Gap in the UK Heat Pump Sector and the Impacts on a Just Transition to Net-Zero \(strath.ac.uk\)](https://www.strath.ac.uk/news/the-installer-skills-gap-in-the-uk-heat-pump-sector-and-the-impacts-on-a-just-transition-to-net-zero/)

¹¹ see for example <https://www.bloomberg.com/news/features/2023-11-07/the-57-trillion-ev-market-is-a-battleground-for-china-us-eu>

¹² <https://www.autocar.co.uk/car-news/business-environment-and-energy/average-car-uk-10-years-old-says-acea>

alternatives as well as stronger planning guidance to ensure alternative transport is prioritised.

Commercial transport is largely covered under industry below, but we note that there is significant scope to electrify local commercial transport such as buses, delivery vehicles, taxis etc. at a faster pace than currently. The UK is lagging in the development and uptake of electric buses for example. Such a switch would provide health and noise benefits as well as climate gains. The government should consider making funding available particularly to support infrastructure here.

Industry

Several key industry sectors have material carbon emissions. These include iron and steel, chemicals, cement, and heavy transport including air travel. Recent government strategy has seemed to rely on CCS as providing a solution here, with some unfocused support for hydrogen. However as discussed above this is a high-risk strategy given how expensive and unreliable CCS appears to be.

In contrast, although currently some way from commercial viability, there are clear paths to more genuine sustainability in most key industrial sectors:

Iron and steel can convert to low carbon iron production either using green hydrogen (from renewable energy) in direct reduction iron production (DRI) or possibly through direct electrolysis. These rely on cheap power - which in the UK will mean surplus wind, so will only be possible if the wind industry expands rapidly enough. Without this there is still potential to establish a low carbon iron and steel industry through focusing on steel recycling and electric arc furnaces.¹³ (Note significant amounts of scrap steel are exported rather than recycled domestically.) The deal to electrify steel making at Port Talbot is a modest step in the right direction, but a lack of support for DRI and a significant gap in production is failing to support innovation and a just transition. Note also the promise of CCS is notably dangerous in steel, as this makes the industry complacent when the sector is particularly vulnerable to a disruptive transition with new pathways.¹⁴ Furthermore, demand for low carbon steel is starting to materialise as other industries focus on supply chain emissions – notably the car industry is beginning to look beyond electric vehicles to its supply chain for the next stage of emissions reductions.

The chemical industry is extremely complex, with thousands of reactions and products, so complete decarbonisation is challenging. However, significant progress can be made – heat pumps can provide low grade heat, hydrogen can provide high

grade heat. Hydrogen also can be used in many reactions or to produce other reagents. There is growing scope to use biological source materials (e.g. ethanol). Getting to net zero in this sector may take a long time, but progress can and must start to be made now.¹⁵ This sector is also at risk of significant disruption should other producers move faster and show more innovation.

Cement is a challenging sector as CO₂ emissions are a fundamental part of the product creation, not just a by-product of heat use. Some of the most popular proposed alternatives are not compatible with a low carbon world. However, alternative materials that produce significantly less carbon in processing have been identified and can be commercialised. This is also a sector vulnerable to product substitution and reduced demand.

For industrial transport, low carbon fuels are technically possible. Given the advances in batteries, electrification may provide a solution for a wider range of vehicles than currently envisaged. Hydrogen, or fuels directly derived from it (such as ammonia), may provide a solution for those transport areas less easy to electrify – with air travel likely to remain the most challenging.

In conclusion, decarbonising industry can be achieved, but not by relying on a single large scale, end of pipe solution such as CCS which is unproven, particularly at the large scale required, and almost certainly high cost. Instead, it requires working on the details of each sector, identifying currently available solutions and the best mechanisms for implementation, and supporting technology development as appropriate. A priority should be to set industry specific targets and establish broad partnerships to support transition in detail. Some of the substantial sums allocated towards CCS and hydrogen should be re-allocated to encouraging and supporting general electrification of industry (e.g. large-scale heat pumps) and more targeted innovation.

Agriculture

Agriculture is a significant source of emissions and one that has been somewhat neglected so far by government action – partly out of fear of the sensitivities around telling people how to eat. However, there are substantial synergies with other key food issues: health and food security. A low carbon diet is both significantly healthier and more domestically orientated than existing diets. There is also substantial scope for innovation, from supplements to reduce cattle methane emissions to precision crop management using drones. Finally, agriculture offers the potential for “quick wins” – without the need for

¹³ A brighter future for UK steel, green alliance, September 2023, <https://green-alliance.org.uk/wp-content/uploads/2023/08/A-brighter-future-for-UK-steel.pdf>

¹⁴ Currently steel is made by first producing pig iron from iron in blast furnaces. This contains high levels of carbon as a result of using carbon (metallurgical coal) to reduce the iron from the ore. This is then removed in basic oxygen furnaces to produce steel. Green processes will not add this carbon so will not need this two-step process, creating the opportunity to do things very differently.

¹⁵ A new formula: cutting the UK chemical industry's climate impact, Green Alliance, March 2023

massive infrastructure changes, changes to food production can immediately help to reduce emissions.

A sensible first step for the food sector would be to start developing some form of climate labelling to inform consumers, help promote awareness and discussion among the wider public, and encourage innovation. At present, consumers cannot easily even find out if their food is air freighted. It would also engage supermarkets and food producers in producing solutions.

Direct support for agricultural innovation would also be effective, as would improved carbon accounting in the sector, given the complex flows between plants, animals, soils and atmosphere.

Finance and Corporate Governance

UK governments have been keen for the UK to build on existing progress to become a green finance hub. The growth in the UK renewables industry has helped drive this, with the UK being seen as a good and easy place to invest. However, this reputation is now under threat, with delays to projects, rising competition from abroad for capital as a result of climate action in the US and EU, and the headwinds created by Brexit. More serious, however, is a leadership undermining key elements of the climate strategy for short term political gain and ignoring warnings from industry and advice from expert bodies. The failure of the offshore wind auction in September 2023 was particularly significant in undermining confidence.¹⁶

To redress this, the first and most important step is to relaunch the UK's current climate strategy so that it regains leadership, genuinely supports technology and innovation, supports a wide range of industries and gives investors and business the long-term confidence they need. Current plans fail to provide that confidence, so investor attention is switching elsewhere.

Aligned with this, there needs to be a greater focus on mobilising investment, to ensure the necessary capital is made available to finance the UK energy transition. The following specific actions would help rebuild and energise UK green finance:

- **Proper transition plans.** The new government intends to increase requirements for companies to produce transition plans. These need to be made mandatory and go beyond currently proposed frameworks. They should be based on a full understanding of impacts of the business on the climate and reflect the risks of a disruptive transition. Many transition plans lack specifics, particularly of capital expenditure, competitive threats and technology risks. Too often there is an over reliance on CCS or other unproven or end of pipe solutions rather than a genuine transition. Importantly, they need proposer assurance - all too often transition plans are prepared separately from core business activities and reporting. In an extreme example of this the 2024 Shell transition plan has the following disclaimer: *"The use of the term Shell's "Net Carbon Intensity" is for convenience only and not intended to suggest these emissions are those of Shell plc or its subsidiaries."*
- **Action to facilitate equity ownership and increase risk appetite in the UK** would help support the energy transition, so investment rules for pension funds and insurance companies need updating. Enabling more investors to access private markets would be a further step forward.
- Although the green finance strategy recognises the importance of ESG stewardship, other recent policy reforms have focused on weakening the governance framework and the listing regime in the UK. It is essential investors are able to rely on the information they are given and can hold companies to account on climate risk, so any stock market reforms should strengthen, not weaken, shareholder rights in this regard.
- The green finance taxonomy urgently needs completing and launching. The UK taxonomy should be compatible with, but ideally more robust than the EU taxonomy – otherwise it risks becoming redundant and further marginalising the UK investment industry.

¹⁶ <https://www.theguardian.com/environment/2023/sep/08/what-went-wrong-at-uk-governments-offshore-wind-auction>

Conclusion

UK climate policy should be reset to ensure the UK economy is not left behind. At present, other countries are pushing ahead and increasing their actions on climate, with often what are more dynamic and expansive policies. To ensure the UK plays its leading role, it should avoid delaying climate policies. Such delays endanger UK competitiveness and makes the UK a less attractive place to invest, particularly for long term investors such as LAPFF members.

UK climate strategy has been overly focused on large scale solutions with limited economic justification, high risks and long delivery times, and fails to foster a broader innovative environment, which will create globally leading solutions. The influence of the oil and gas industry is evident, which does not inspire confidence. A particular concern is cost effectiveness of many proposals, with substantial sums being allocated to speculative or outdated solutions. By redeploying public funds to address key blockages such as training and genuine innovation, it should be possible to have a considerably greater impact on climate mitigation and UK competitiveness without significant increases in overall spending.

The UK has time to do so, foster innovation and support a broad and just transition. LAPFF hopes the ideas and analysis in this report will facilitate a refocusing of UK climate policy to the benefit of the climate and the UK. ●

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