Parthena Exizidou, Michael Johnson and Nasrin Khanom give their views on the challenges of delivering carbon reduction targets to net zero and beyond.

by Parthena Exizidou, Senior Carbon Manager (Net Zero transition lead) at British Antarctic Survey

Beyond Net Zero

Many businesses have Net Zero roadmaps to 2025, 2030 and 2040, but what next?

Undeniably achieving Net Zero is the biggest challenge our planet faces at the moment and therefore most businesses' focus is on climate change mitigation measures to deliver their targets. However, depending on which pathway we choose to take, the impact of the Net Zero transition period could be significant in a post-2050 world.

The Net Zero transition technologies, such as renewable and low carbon systems, require natural resources that are scarce, difficult to access and with concerning issues regarding their decommissioning and end-of-life management. According to the International Energy Agency, there is a looming mismatch between our Net Zero ambitions and the availability of critical minerals that are essential for this transition[1].

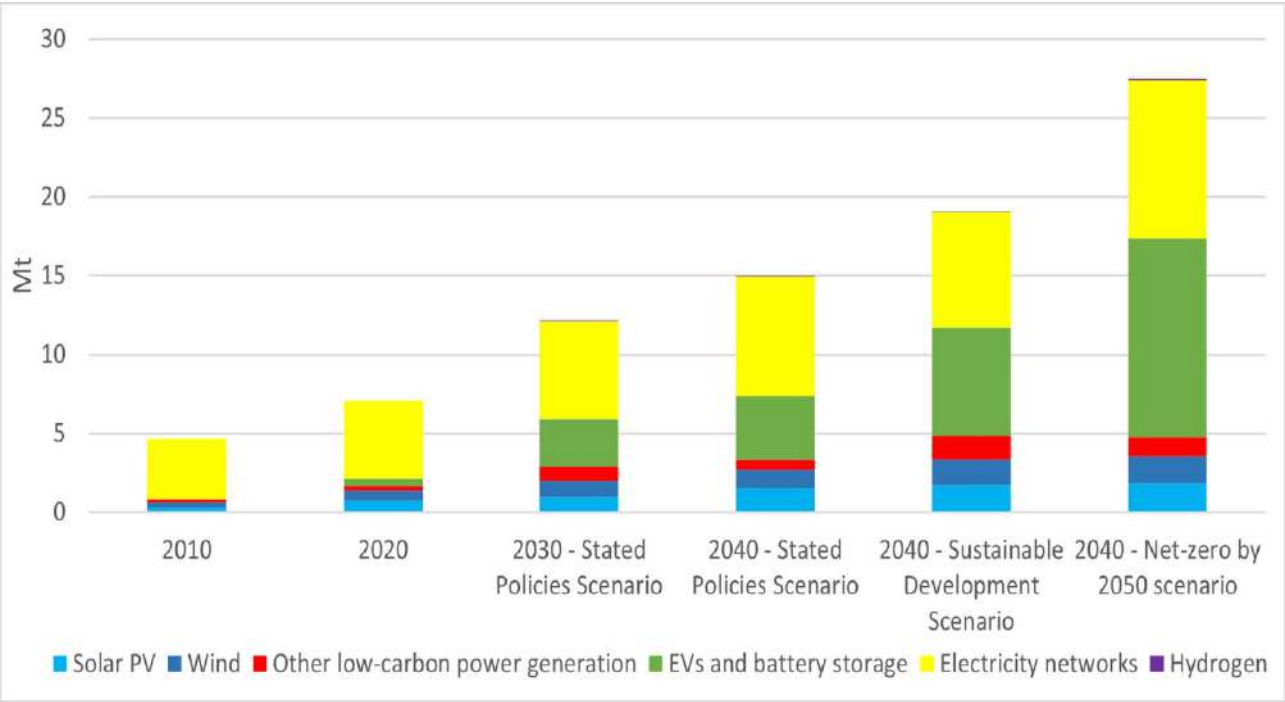

Figure 1: Total mineral demand for clean energy technologies by scenario, 2020 compared to 2040.[1]

Demand for these technologies will significantly increase by businesses as they are and will be the backbones of the energy systems to support decarbonisation with potentially a significant environmental and social cost linked to the extraction/mining of these resources.

The graph on the previous page is a very clear illustration of the extend of the demand on these resources going forward.

Globally, as part the roadmap to 2050, 90% of the electricity generation will come from renewable sources with solar and wind to account for 70%[2]. More specifically, here in the UK we have the largest offshore wind farm in the world and that capacity is expected to increase by 2030[3].

Not carefully planned rapid scale up of low carbon technologies without consideration of available resources and their end-of-life stage could risk the security of supply and lead to supply shortages with an impact on cost and inflation.

Policy consideration should focus on embedding circular economy principles to the design of those systems that will ensure that the recovery of these minerals is enabled and therefore will improve resilience and improve accessibility.

On the other hand, businesses also need to invest more in circular economy and embed such principles for any new and established low carbon technology/system that is part of their Net Zero journey; to ensure that 20 or 30 years later at the end of their lifespan, which is very close to 2050, we have considered the end of life and decommissioning of these systems and minimised waste generation.

In addition, to achieve Net Zero by 2050 and looking beyond, we need to strategically consider diversification of energy sources and systems at a business, country and global scale, which will ensure resilience and potentially solve some of the existing resource issues.

It is crucial that businesses assess the social and environmental impact of their Net Zero strategies for an extended timeframe post-2050 in order to prevent or mitigate any unintended consequences.

This long-term evaluation, beyond 2050, is also required at a government level to ensure that climate policy addresses these concerns. Whatever the pathway to net zero, it should ensure stable and affordable energy supplies beyond 2050.

What are the challenges to 2050 and beyond?

The first challenge we are facing is that we don't have adequate climate policy and strong implementation plans for reaching Net Zero by 2050.

The commitments by governments currently fall short, which according to UNFCCC, would lead to a 14% increase in global greenhouse gas emissions by 2030 compared to 2010 levels. To keep global temperature rise to no more than 1.5°C, a 45% reduction is required by 2030[4].

Access to large scale financing, specifically to support the scale up of emerging technologies, is also falling short. The projections to 2050 indicate that almost half of the reductions are expected to come from technologies that are currently at demonstration or prototype phase and require scale up.

Moreover, we still have a number of key uncertainties in the pathways to Net Zero, such as the role of alternative sustainable fuels for hard to decarbonise sectors such as shipping, aviation and others, and the ability to scale up negative emissions technologies such as carbon capture and storage.

> "We will all need to play our part at personal and business level to overcome these challenges.

Moving away from fossil fuels will require fundamental change in the way we consume, produce and move and it will result in significant disruptions. We need to have appropriate measures and required resources to help us get through this transition period.

Another big challenge to 2050 and beyond is the land-use competition. A major shift in land use is required with adequate financial investments to increase carbon sequestration through afforestation, low-carbon farming along with re-skilling and education programmes and a significant reduction of food waste and consumption of highly carbon intensive foods.

We will all need to play our part at personal and business level to overcome these challenges.

How do energy managers inform and engage that we are on a continuous journey and Net Zero is just a milestone?

A rigorous assessment and evaluation of the net zero policies and pathways can identify potential unintended consequences and risks around the net zero transition and beyond 2040 or 2050. This is a process that requires a much wider contribution from across all areas of an organisation.

Effective communication and engagement are absolutely required as it's a key way of promoting dialogue and uniting people around the Net Zero commitment. This can be achieved through a variety of means including through the form

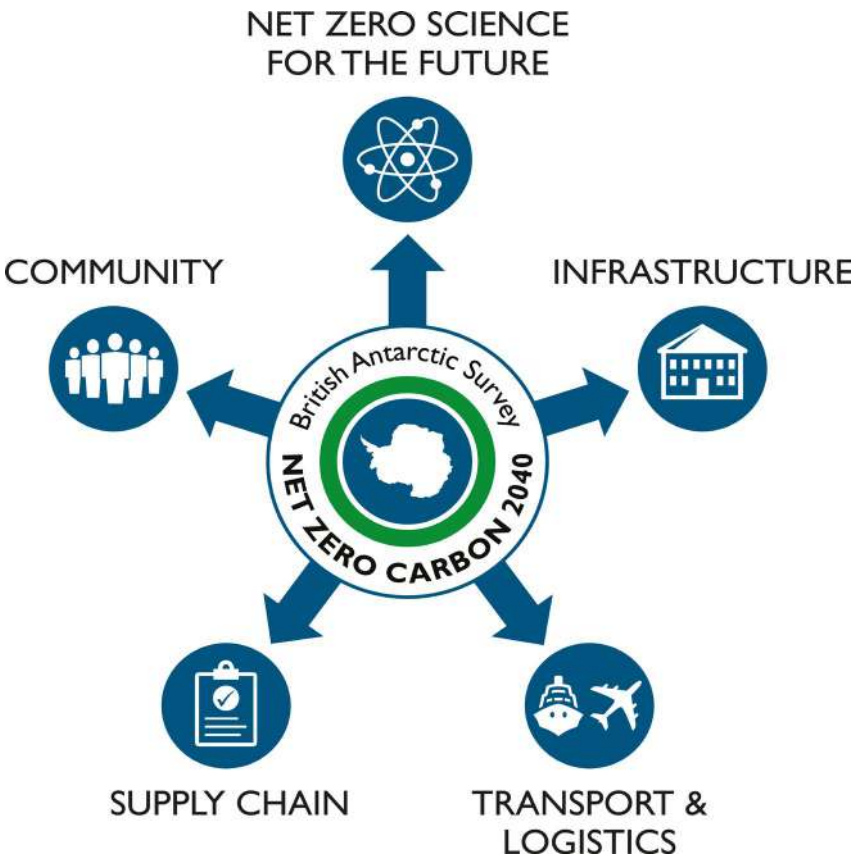

Figure 2: Key pillars of the Net Zero Carbon Strategy at the British Antarctic Survey

of workshops; awareness events and talks, wider internal campaigns and above all more training such as Carbon Literacy and wider sustainability training.

Raising awareness and being transparent about our Net Zero journey, its milestones and beyond can drive the transformation process that the Net Zero agenda of any organisation needs.

What are the Scope 3 challenges and how are you engaging with colleagues and stakeholders?

The biggest challenge when it comes to supply chain emissions is accessing the data required to build a comprehensive baseline and set clear targets and guidelines for the suppliers to follow. The data need to come from suppliers directly as often these emissions can be well hidden in the supply chain.

In addition, Scope 1 and Scope 2 emissions are usually prioritised when there are limited available resources in an organisation.

At the British Antarctic Survey, Supply Chain is one of the 5 key pillars of our Net Zero Carbon Strategy. One of the key strategy objectives is to work closely together with our suppliers to develop common goals and targets around, not only carbon, but wider sustainability.

Last year we delivered a study to identify the top 10 contributors of our supply chain carbon. As expected, the construction activities from our Antarctic Infrastructure Modernisation Programme (AIMP) accounted for the largest part of Scope 3 emissions.

As part of the AIMP, we are delivering large scale infrastructure projects in Antarctica which include a new science and operations building, an aircraft maintenance facility, improvements on our runway and more. This programme is crucial to future proof our facilities in Antarctica and support our decarbonisation plans.

To deliver this ambitious programme of works we have formed strong partnerships with our technical advisors and construction partners with whom we share common goals and values around sustainability. I find this of significant importance when it comes to reducing the impact of Scope 3 emissions.

Together we have developed a sustainability strategy based on the UN Sustainable Development Goals, specifically for the AIMP, and individual sustainability management plans that are delivered at the end of every work stage and for every project under the programme of works. We also follow PAS 2080 which is a standard for Carbon Management in the construction process to assess and help us reduce the carbon impact of our construction activities.

We are also working together with our procurement team, our engineers and estates colleagues to add sustainability criteria into all tender exercises which include among other, criteria such as embodied carbon impact of products, information on bidders Net Zero/Sustainability commitments, introduction of circular economy principles under specific projects and inviting suppliers/bidders to explain how they can contribute to the delivery of our Net Zero commitments.

There is still a lot more work to be done in this space, from understanding the impact of our whole supply chain to working together closely with more of our suppliers to achieve a reduction in the carbon impact of our Scope 3 emissions. Part of this effort includes the strengthening of the implementation plan under

our sustainable procurement policy. Fortunately, we recently secured funding to address this.

What would you do differently?

We started seeing the effect of people getting numb towards this huge challenge that we are facing. We need more inspiration and a better focus on the benefits and opportunities that this process will deliver for us as an organisation but also for humanity and our planet. I therefore think I would invest more time in communicating that message across our own organisation and more widely in our sphere of influence.

What approach are you taking to off-setting in short to medium term?

At the headquarters of BAS in Cambridge, since 2019, we buy renewable electricity from the grid through REGOs (Renewable Energy Guarantees of Origin) which is a form of carbon offsetting.

However, since 2019, we have invested significantly in renewables adding more that 650kWp of solar on our site, in the form of solar carports and solar roofs through which we meet nearly 40% of our electricity demand and even exporting to the grid during sunny summer days. There is no other form of carbon offsetting that we are looking at as part of our roadmap to net zero in short and medium term.

Currently, we are racing to reduce our emissions through improving our efficiency, optimising our energy use and increasing the contribution of renewables across our estate to hit our interim target for 2025 which is approaching fast.

Is off-setting on the table beyond 2040, and if so, why?

I believe that Carbon Capture and Storage technologies will play a significant role in achieving 2040 and beyond. We will still need to use to some extend fossil fuels for the development of specific products even if we manage to decarbonise the energy and transport sector. The extent to which we will use such technologies will depend on the success of technology scale up which is required to achieve our Net Zero targets.

Author's Profile

Parthena is the Senior Carbon Manager (Net Zero transition lead) at the British Antarctic Survey (BAS). She is an engineer by background with more than 12 years of experience on energy efficiency, carbon reduction and wider sustainability.

At BAS she is leading on the development and implementation of the Net Zero Carbon strategy for the BAS Infrastructure, Transport & Logistics and Supply Chain activities.

Sources:

1. The Role of Critical Minerals in Clean Energy Transitions – Analysis - IEA
2. Net Zero by 2050 – Analysis - IEA
3. Office for National Statistics: https://www.ons.gov.uk/
4. UNFCCC NDC Synthesis Report Update (Nov 2021)

by Michael Johnson, Environment & Sustainability Lead at Cheshire Constabulary and Cheshire Fire & Rescue Service

Beyond Net Zero

Many businesses have Net Zero roadmaps to 2025, 2030 and 2040, but what next?

Although there is a challenging target to get to net zero, many think that this is the objective. There will be no winning tape at the end of this race. It is easy to have a plan and there will be many neatly bound volumes showing the way. Perhaps the question should end "but how many will achieve it"? There continues to be challenges with many aspects such as funding and the whole enormity of the task. Many net zero plans cover all the technical advances in M&E efficiencies, self-generations via solar or wind, lighting, window improvements, but lack a holistic approach to the whole building.

Heat pumps are clearly a very favoured alternative currently, but in a 50s/60s building where there is not also a plan to manage and improve the fabric of the whole building it seems rather a short-sighted solution. Plus add the continuous costs to maintain a building at this level while funding further net zero building costs.

In many cases the improvements and actions we take today will have reached end-of-life before 2050 or even 2035/40 in some cases. Do the roadmaps include a commitment to continuously reinvest all savings back into future projects and improvements?

In July, we experienced the hottest day on record and I expect all our air conditioning and air handling systems (usually not initially designed for such temperatures) were working to their maximum and consuming more energy. So, what next? Review, revise, flexibility, continue learning, sharing and engaging with new techniques and technologies.

What are the challenges to 2050 and beyond?

I work with two "collaborated" organisations, but both different in their approaches to driving net zero and beyond. One comes under the control of the Police and Crime Commissioner and one under the Local Fire Authority. Both our organisations are making satisfactory progress against published targets, but the final portions of emissions will be challenging.

The identification of the organisational embedded carbon emissions and the reduction of these is not yet available. Innovative technologies and fuel sources are being developed all the time and I am confident that there will be an answer in terms of technology, but I am less confident on behavioural and cultural change that will be needed.

The long-term challenge is the adoption of robust sustainable practises within organisations. Many do not understand what sustainability is and the reason this should be the main driver for progress. Organisations that fully embrace the need to respond to the whole social, bio-diverse and environment issues will be the longer-term winners. Reduction of carbon emissions is not the only metric to deliver a positive response to achieve and maintain a better, fairer and living planet.

How do energy managers inform and engage that we are on a continuous journey and Net Zero is just a milestone?

Getting engagement on Net Zero was a challenge until there was a ground swell of popular engagement. There has been a movement at a very senior national emergency services level and that is beginning to filter down, driven by this populous movement. The local authorities have also played their part in asking the important questions and setting agendas.

We have updated Impact Assessments to a quite simple format of questions that means more products and services do appear on my desk from the project teams. The benefits were viewed as making operational and purchasing colleagues think about aspects such as energy usage, even from a supply chain perspective in terms of where it was sourced from.

The second benefit was allowing engagement back to the project to ensure energy, environment, ethical procurement policies, sustainable questions were being considered.

What are the Scope 3 challenges and how are you engaging with colleagues and stakeholders?

Scope 3 will only get the focus it deserves when it is reportable. New procurement and social value policies have been put in place that should have some effects on this point, but no resource to investigate and analyse data. Real analysis of supply chain, commuting, waste and business mileage in our case is needed and will identify the value of managing and reducing these effects. How in the emergency service sector we deal with this will need specialist help in the measurement and then direction on a solution.

We endeavour to source locally either material, equipment or services. This is challenging in many respects due to our specialist equipment requirements. Only the largest and better resourced organisations look seriously at Scope 3 currently. Waste and business mileage are easy wins in reporting and trying to drive improvements, but the major challenge is supply chain.

If you set a standard or policy and monitor and manage your procurement of a product or service, then you can see the value of improved performance in supply chain. I think many lack the next step of collecting and setting the data and then monitoring delivery. That is not an easy task if you have large, complicated supply chains. It is my opinion and perhaps the fault of people like me who do not spend enough time or have enough time on the detail of the specification of tenders.

> “Even in what appears nationally linked organisations it is clear from discussions that individual services are at vastly dissimilar stages of engagement from decarbonisation, renewables, to electric vehicles and sustainability.

What have you learned from the journey so far?

What I have learnt in recent years is that you must broaden your thinking from just energy, or the standard environmental compliances and look at the whole sustainability subject. The global UN goals gave us a template and importantly a leadership. Although at first glance some might appear to be outside the route to Net Zero, but on a closer inspection and understanding they are intriguingly linked. We must look at people, planet and in our case the public purse to really make an impact and improve.

I currently chair the Emergency Services Environment and Sustainability Group (ESESG) with representation from many of the Police, Fire and Ambulance services. We also include the Royal National Lifeboat Institute and Victoria Limbick (EMA Steering Group Member) is an active contributor to our bi-monthly meetings. Even in what appears nationally linked organisations it is clear from discussions that individual services are at vastly dissimilar stages of engagement from decarbonisation, renewables, to electric vehicles and sustainability.

For example, Mohammad Rafique who is another EMA Steering Group member delivered infrastructural and non-blue-light fleet to Surrey and Sussex Police several years ago with the benefits of carbon savings, reduced diesel fuel bills and reduced maintenance. However, many other forces are only now starting the journey of looking at non-fossil fuel vehicles! Unfortunately, our group’s loss has been the Home Office gain as Mohammad has taken his passion to the centre of Government, and we miss his contribution.

When I joined the EMA in the early days it was about sharing, learning, and engaging with other energy specialists. We try to follow a similar process with the ESESG and share ideas, share best practice, share learning, share a national identity so we can all move progressively forward. This have been further progressed with the publication of our National Charter which has been endorsed at a senior police and fire national level.

My personal development has been maintained and enhanced by

sharing and engaging with many like professionals and my lessons learnt for the future is sharing and engagement must continue and grow as collectively we have a bigger voice and credibility to deliver.

What would you do differently?

Hindsight is a wonderful thing, and I do not know what I would have done differently with the messaging and communications to get some of the engagement we have now. I should have looked for more opportunities to share as above, but there was not as many opportunities as we have now. I worked in a Top 100 organisation as the requirements for CRC and then GHG were brought in, and the messages were clear about the future and what was required.

It did take introduced regulations to begin to get senior engagement and the growing trend of green investors in companies. There was also the "return on investment" criteria set by senior finance leaders at usually circa 2 years that made even simple LED projects difficult to pass muster.

I know many colleagues in different businesses who had the same challenges and the same story to tell at conferences and industry meetings. We were all envious of the person with an engaged CEO or CFO who saw the benefits of environmental and sustainable improvement. Many did not recognise that improvement saved money longer term from reduced consumption, reduced carbon taxes, positive brand and communications opportunities, investor and stakeholder benefits, and most importantly a great message to their customers.

What approach are you taking to off-setting in short to medium term?

We have engaged with local offsetting linked to Cheshire Wildlife Trust and we are at initial stages in investigating this to mitigate emissions that we struggle to reduce due to technology or restricted capital expenditure. Our local authorities are engaged with this and there are many local projects, which links to our commitments to Cheshire. What form this takes has not been proposed or decided yet, but both organisations are committed with delivering a first-class service to the residents of Cheshire and I see this as another way that we demonstrate that commitment and lead by example.

Is off setting on the table beyond 2040, and if so, why?

My intentions currently are to look at short, medium and longer-term projects. Bio-diversity management will not cease with Net Zero, so I see the need for Government, businesses and organisations like ours continuing to work with these projects. 2040 or 2050 will only be achieved and maintained with some forms of off-setting and management of our wider environment.

Poor investment in public buildings over many years means the bill to deliver the infrastructure everywhere in time is beyond the public purse. "Off-setting" as a term needs to change as I think it has attracted poor publicity and accusations of green-washing. If organisations engage with the global goals set out by the UN and embed these principals in their sustainable planning and engage properly with their colleagues, this will provide the progress we need. There are positive actions that can be taken by everyone, every organisation, large or small.

Author's Profile:

Michael has worked with Cheshire Constabulary and Cheshire Fire and Rescue service for six years now. Previously, he ran his own company after spending 25 years with the Carphone Warehouse plc Group in a range of environmental roles. Michael is a Member of the EMA since the beginning, IEMA, CIWM and chairs the National Emergency Services Environment and Sustainability Group.

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by Nasrin Khanom, Environment and Sustainability Manager at University of West London

Beyond Net Zero

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Historical emissions:

One of the most difficult challenges is addressing historical or lifetime emissions. These are the cumulative emissions that humans and organisations have produced since their inception. For many organisations, the current way of thinking about achieving net zero is to choose a carbon baseline for a period that reflects a typical operation and then reduce it to zero by 2025, 2030, 2040, and so on.

While there are advantages to this approach, it does not account for the total emissions that organisations have accumulated each year since incorporation. These are still emissions trapped in the atmosphere that cannot be ignored; organisations must be held accountable for historical emissions. There are opportunities for the government and industry sector bodies to guide organisations in both the public and private sectors in addressing historical emissions, starting with data gathering.

Climate justice:

Another significant challenge is achieving climate justice. By 2030, the United Nations Sustainable Development Goals (UN SDGs) will ensure that everyone has security and access to basic human rights, such as affordable clean energy.

The SDGs are also used as a framework for delivering climate justice, which is especially important in light of the current Climate Emergency. The SDGs make a central commitment to leaving no one behind, ensuring that development progress reaches the most vulnerable and marginalised populations. The SDGs require world governments to maintain an equal balance of environmental, social, and economic priorities in order to create a sustainable developed world.

According to a recent UN report, the world is not on track to meet the goals by 2030[1]. The lack of progress highlights the difficulties in achieving a fair and just future for people and the planet, implying that efforts to create a sustainable world must continue beyond 2030.

While the UK government is responsible for achieving the SDGs at home and supporting their international implementation, both public and private sector organisations play critical roles in delivering environmental and social sustainability.

For example, the University of West London (UWL) has used the SDGs as a lens through which to focus efforts on both climate change and broader social sustainability concerns. UWL is committed to delivering long-term sustainability and will continue to contribute to sustainable development by adhering to the SDG principles.

What are the challenges to 2050 and beyond?

Government commitment to net zero:

It is clear that the UK government is in an instrumental position to take the lead in achieving the nation's net zero target, and failure to prioritise climate action puts the UK at risk of failing to meet net zero. Meeting our net zero commitments requires

[1]https://unstats.un.org/sdgs/report/2021/The-Sustainable-Development-Goals-Report-2021.pdf

the government to implement the appropriate policies, strategies, and resources as well as 'policing' measures.

Analysing the previous trend is a good way to determine whether a goal is likely to be met in the future. In the past, it has been difficult for governments around the world to achieve environmental sustainability goals like the UN Millennium Development Goals[2].

The recent UN progress report on the SDGs demonstrate the current challenges in maintaining an equitable mix of environmental, social and economic concerns. In the UK, for example, there have been occasions when our national green targets have not been fully met, most likely due to competing priorities. However, the UK government has recently taken the lead in addressing the global climate crisis, particularly with the government reaffirming its commitment to climate action at COP26.

The UK has met its first and second carbon budgets as part of its net zero target, and is on track to meet its third, indicating that there is light at the end of the tunnel. However, according to the most recent Climate Change Committee (CCC) report, the government is falling short of meeting future carbon budgets[3].

The CCC recommends that the government implement more stringent measures to achieve net zero by 2050. This includes becoming more energy efficient and switching to low-carbon fuels for heating and transportation. It also entails shifting away from coal and gas-fired power and toward low-carbon sources such as renewable energy.

"The short-term challenges, however, highlight the stark reality that, while pressures to combat climate change are increasing, our ability to address the hard-to-abate energy sector is currently inherently slower than required. It also highlights the importance of accelerating innovation and creativity in order to address obstacles sooner.

The government's recently released 'UK Energy and Security Strategy' reaffirms its commitment to decarbonisation and sets new ambitious renewable energy generation targets to reduce over-dependency on fossil fuels[4]. However, it also includes investments in new fossil fuel projects in the UK, which the government justifies as a short-term measure to minimise disruption on energy supply and meet demand whilst moving away from foreign sources of energy and transitioning to a low-carbon future. The government sees such investment as necessary because over 90% of our homes are heated by fossil fuels, and any energy shortage could result in a cost-of-living crisis.

While there is room for additional measures to reduce energy demand, the government emphasises that the strategy is intended to provide long-term security and affordability of renewable and clean energy. The short-term challenges, however, highlight the stark reality that, while pressures to combat climate change are increasing, our ability to address the hard-to-abate energy sector is currently inherently slower than required. It also highlights the importance of accelerating innovation and creativity in order to address obstacles sooner.

If we go back further in time, the Industrial Revolution, which lasted 80 years, was the last major change in how our world supports and sustains itself. While we are much more advanced now, we are still developing and testing new technologies on the cutting edge of engineering and science, just as they were in the 18th century. To expedite this, we need significant investment and buy-in, and while the government must lead from the top with policy and education, every level of the business hierarchy, education system, and social fabric must take ownership to accelerate national progress.

<u>Energy industry's commitment to net zero:</u>

Since it accounts for the majority of global emissions — nearly three quarters of all emissions — the energy industry has a big impact on the environment[5]. The energy industry is also a major contributor to the economy[6]. For example, The

[2]https://ourworldindata.org/millennium-development-goals

[3]https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/

[4]https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy

[5]https://ourworldindata.org/emissions-by-sector

[6]https://www.ofgem.gov.uk/sites/default/files/docs/2020/02/oguk_evidence_economic_report_2019.pdf

Guardian published an article in July 2022 on a new study that revealed that over the past 50 years, the oil and gas industry has generated £2.3 billion daily in pure profit[7].

This implies that the energy industry can play a significant role in achieving the UK's net zero target and creating a green economy, especially being the largest contributor to emissions and gross national income. However, according to a recent report published in November 2019 by Oxford University and the Transition Pathway Initiative and titled 'A survey of the net zero positions of the world's largest energy companies'[8], only 13 of the 132 companies surveyed in the energy sector (or 10%) had committed to net zero.

According to the study, the energy industry appears to be only beginning to think about net zero. The low uptake by energy companies in committing to net zero implies that more work is needed in the industry to phase out activities that damage the environment.

One suggestion is for all businesses in the global energy industry to work together and make a commitment to net zero, with support from the world governments, starting with the formation of an international working group that establishes a governance and industry strategy for reducing global emissions.

Businesses commitment to net zero:

While the government must meet its commitment to become net zero, businesses must do the same. The UK is taking the lead, according to the Department for Business, Energy, and Industrial Strategy, with at least sixty of the UK's FTSE100 companies signing up to the UN's Race to Zero campaign as of November 2021[9].

This represents two-thirds of UK large businesses, however there is scope to expand into other FTSE indexes and capture the entire business community to commit to net zero.

It is also worth noting that small and medium-sized enterprises (SMEs) account for 99% of all businesses in the UK and account for half of all business-related emissions[10]. The government launched the 'Together for our Planet' campaign in May 2021 to encourage SMEs to commit to net zero.

However, only 3,357 SMEs had made a pledge by signing up to the UK's SME Climate Hub as of July 2022[11]. Given that there was 5.5 million of SMEs at the start of 2021[12], there is an opportunity to engage more SMEs in committing to net zero.

Education and awareness campaigns are one method of gaining support. Higher Education Institutions (HEIs) play an important role in achieving net zero, particularly in terms of education and awareness raising. Climate change was discovered by scientists and academics, and HEIs continue to have a large pool of scientists working on solutions to this global problem. HEIs are viewed as anchor institutions during emergencies, and in this Climate Emergency, net zero is more important than ever for academic institutions to develop future thought leaders.

UWL is committed to net zero and is working hard to reduce its operational emissions and embed sustainability into the curriculum so that all our students are well equipped to work in the future global green economy. UWL is also committed to helping the local community in reaching net zero through its outreach work.

UWL's award-winning Fresh Minds for Business programme is one example of how it is assisting SMEs in their transition to net zero. Fresh Minds for Business is a non-profit consultancy service delivered by UWL students and supported by experienced consultants at the Claude Littner Business School.

[7] https://www.theguardian.com/environment/2022/jul/21/revealed-oil-sectors-staggering-profits-last-50-years

[8] https://www.oxfordmartin.ox.ac.uk/publications/a-survey-of-the-net-zero-positions-of-the-worlds-largest-energy-companies/

[9] https://www.gov.uk/government/news/cop26-sees-uk-businesses-lead-the-world-in-climate-change-commitments

[10] https://www.british-business-bank.co.uk/press-release/smaller-businesses-responsible-for-around-half-of-all-uk-greenhouse-gas-emissions-from-businesses-british-business-bank-research-reveals/

[11] https://businessclimatehub.org/uk/

[12] https://www.fsb.org.uk/uk-small-business-statistics.html

Through this programme, our students are currently collaborating with local SMEs and local authorities to provide consultancy support for environmental sustainability, which includes education on net zero as well as calculating emissions and making recommendations for reduction.

It is also worth noting that the penalties intended to encourage climate action for all businesses and institutions that fail to comply with the Climate Change Act appear to be ambiguous and limited to participants in trading schemes such as the UK Emissions Trading Scheme.

Extending the penalty's scope to the entire business community, as well as designing it to favour climate action, including introducing a carbon tax, could encourage businesses to commit to delivering net zero.

Green finance:

Transitioning to net zero requires significant financial resources. However, some financially vulnerable groups, such as SMEs, third sector, public sector, and low-income households, will struggle to use internal funds for net zero projects and will require external funding to achieve net zero status, implying that green finance must be a key component of any 'Levelling Up' strategy.

The UK government has invested in green finance schemes to assist financially vulnerable groups, such as the Public Sector Decarbonisation Scheme (PSDS), in which it has invested more than £2 billion to reduce emissions from public sector buildings[13].

UWL received £5.1 million from the PSDS Phase 1 scheme in 2021, allowing the University to install large-scale renewable and clean technologies such as ground source heat pumps, air source heat pumps, and solar photovoltaic thermal systems. The combined measures save over 520 tonnes of CO_2 per year, bringing the University one step closer to meeting its net zero by 2030 target.

> "As the evolution of technology and methodology demands creativity and innovation, it could be advantageous to promote further diversity in the green skills workforce as this is known to drive creativity by combining a variety of perspectives and life experiences.

Despite the current funding stream, UNISON published a report titled 'Getting to Net Zero in UK Public Services' in November 2021[14], stating that the public sector can lead the way to net zero, but only if significant government funding is provided.

According to the UNISON report, the UK public sector will require £140 billion in funding by 2035 to achieve net zero. This demonstrates that significant government funding is required to transition to a net zero economy.

However, it also presents an opportunity for other businesses with significant financial resources to assist financially vulnerable groups in achieving the UK's net zero target collectively; for example, local authorities can take the lead in delivering climate action in their communities by securing green finance and prioritising investment in low-carbon and renewable energy infrastructure, especially in high deprivation areas so that residents can tap into and gain access to free energy.

Green skills gap:

A skilled green workforce is required for the green economy. In January 2022, the Green Alliance published a report on 'Closing the UK's Green Skills Gap'[15], which identified that the UK is facing acute skills shortages across the sectors that need to decarbonise the most urgently.

The creation of 440,000 new jobs by 2030 is a key goal of the UK government's 'Net Zero Strategy'[16]. However, there are opportunities to further define and measure 'green jobs', which should lead to a reduction in the green skills gap.

HEIs play a critical role in closing the green skills gap. While there are examples of UK HEIs taking action to address this, such as some of UWL's degree programmes with environmental modules, this needs to be scaled up so that all courses include some elements of green learning. The Green Jobs Taskforce is assisting the UK government in meeting the target for green jobs. However, there are opportunities for HEIs to collaborate on closing the green skills gap as this is likely to

[13] https://www.gov.uk/government/collections/public-sector-decarbonisation-scheme

[14] https://www.unison.org.uk/content/uploads/2021/11/26609.pdf

[15] https://green-alliance.org.uk/wp-content/uploads/2022/01/Closing_the_UKs_green_skills_gap.pdf

[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf

result in a far greater impact in a much shorter time.

There is also a lack of diversity in the environmental sustainability sector. As the evolution of technology and methodology demands creativity and innovation, it could be advantageous to promote further diversity in the green skills workforce as this is known to drive creativity by combining a variety of perspectives and life experiences.

Monitoring and reporting:

In recent years, sustainability reporting is becoming increasingly important. Organisations that report are transparent about their impact on sustainability issues. There are several frameworks for sustainability reporting nationally and globally for the private sector, but with little consistency.

In general, sustainability reporting is voluntary in the private sector, though in the UK, large businesses are required to report annually on their energy and carbon emissions performance under the Streamlined Energy and Carbon Reporting regulation, as an example.

However, in July 2021, the Chartered Institute of Public Finance and Accountancy (CIPFA) issued a report titled 'Evolving Climate Accountability: A Global Review of Public Sector Environmental Reporting'[17], which stated that there should be a constant priority in aligning and harmonising activities for the main existing sustainability frameworks.

CIPFA also identified that sustainability reporting in the public sector is in its infancy, and that the lack of a mandate for this type of reporting, as well as the challenges identified in preparation, such as data availability and quality, are significant impediments to widespread adoption.

UWL recognises the importance of delivering sustainability in all our activities, including teaching, research and operations. The 2021-22 Annual Sustainability Report[18] is UWL's first report, and it details the University's sustainability accomplishments and plans for the future. The SDGs are used to track our contribution. Although we can claim a contribution to all the goals, we have chosen to focus our strategy for sustainability on four core goals and three climate action goals where we can make a particular contribution at local and national levels.

The core goals are where we consider we are already contributing to the realisation of the SDGs as they are part of our business-as-usual activity; namely quality education, reduced inequalities, decent work and economic growth, and health and wellbeing.

In terms of monitoring these goals, we will use established strategies and monitoring mechanisms. For example, for the reduced inequalities, much of the work we already undertake is monitored and reported on through the Equality and Diversity Advisory Group and this will continue.

The climate action goals are ones where we consider that we can make a contribution to sustainability but where we will need to stretch ourselves to achieve this.

These goals are climate action, zero hunger, and responsible consumption and production. For these goals, specific action plans will be drawn up as part of the sustainability strategy and monitored through the Environmental Review Board.

How do energy managers inform and engage that we are on a continuous journey and Net Zero is just a milestone?

Communication and engagement are critical to achieving net zero and beyond. Energy will be one of the largest sources of emissions for most organisations, so communications and engagement must not be overlooked.

At UWL, the key to ensuring long-term engagement in net zero and beyond is to embed sustainability throughout our existing governance structure, as this is the only way for it to become 'business as usual'.

> "Is it naïve to suggest there is no need or place for offsetting when there are challenges to net zero that are not being addressed quickly enough?

We are working hard to ensure that sustainability is on every committee's and meeting's agenda, and it is done in an appropriate and relevant manner that touches every aspect of the institution. Sustainability must not be treated as an afterthought, but rather as a central theme in all discussions.

Among the most recent examples of our communication and engagement work are the campaigns we ran in 2021 during the PSDS Phase 1 decarbonisation project. During this project, UWL ran campaigns to encourage staff and students to think about energy management on campus and beyond.

[17]https://www.cipfa.org/protecting-place-and-planet/sustainability-reporting

[18]https://www.uwl.ac.uk/about-us/sustainability#Sustainabilitypolicies

We also invited our engineering students to see the technologies that have now been incorporated into formal teaching, as well as holding information sessions with the local community to provide insights into the University's future plans and soliciting audience feedback on what could be done in the future. To engage key audiences in energy management, a dedicated web page was created for this project[19].

In terms of broader sustainability, our students learned about biodiversity by participating in the redesign of the Memorial Garden at the main campus in Ealing, west London, as well as by assisting with carbon footprint labelling on our food menus.

Work is currently being done to develop a sustainable travel plan, which will be completed in collaboration with our students.

These examples provide a snapshot of how important it is to engage key stakeholders in sustainability activities and use it as an opportunity to keep the sustainability conversation moving forward.

Is off-setting on the table beyond 2040, and if so, why?

In an ideal world, the answer would be 'no,' because all humans and organisations will have reduced their consumption of unsustainable materials and resources to zero by 2050, eliminating the need for offsetting. However, is it naïve to suggest there is no need or place for offsetting when there are challenges to net zero that are not being addressed quickly enough?

While the world is divided, the Intergovernmental Panel on Climate Change identified offsets as one of the tools for accelerating climate action in its Special Report in 2018[20]. However, offsets should not be used as a long-term solution, but rather as an interim measure whilst working to fully transition to net zero.

Organisations such as the United Nations Environment Programme[21] recognise the environmental, social, and economic benefits of offset projects such as reducing and capturing carbon, improving air quality, and allowing vulnerable people to access green finance to fund such projects. However, offsets should not be used as a "get out of jail free card", and instead used when no other feasible options for reducing emissions exist.

According to other reports, the net zero transition will be difficult in some hard-to-abate sectors, such as aviation, heavy industries, agriculture and food including beef cattle[22]. Many organisations still find it difficult to address scope 3 emissions, whole-life embodied emissions, and historical emissions; for example, our NHS needs to tackle healthcare incineration.

The challenge for governments is to build a sustainable developed world by equally balancing priorities on three core pillars: environmental, social, and economic. The ongoing challenges imply that offsets will play a role until organisations and world governments fully transition to a green economy.

While there is an offsetting programme in the hard-to-abate aviation sector called CORSIA that is expected to mitigate approximately 2.5 billion tonnes of carbon between 2021 and 2035[23], offsetting a tonne of carbon under CORSIA currently costs on average $3-5 as a minimum[24].

The risk with low-cost offsets is that they make it less appealing for businesses to reduce their own emissions, and that lower-cost offsets do not reflect the true lifetime cost of the offset project including maintenance, assurance and insurance as well as consider the time it takes the project to reduce or capture carbon against the time carbon stays trapped in the atmosphere. The current lack of governance in the voluntary offset market enables potential mishandling of offsets.

Taking current issues into consideration, because offsets play a role in a net zero transition strategy, it is then critical that proper rules in the voluntary market is in place so that the public can only access credible offsets.

Author's Profile:

Nasrin has over ten years' experience in sustainability and is an ISO14001 and ISO50001 qualified lead auditor with experience in developing and implementing sustainability strategies and conducting compliance audits. In 2020, Nasrin was named one of edie's '30 under 30 next generation of sustainability leaders', and the EMA commended her as the 'Energy Manager of the Year'.

[19]https://www.uwl.ac.uk/about-us/sustainability#carbon

[20]https://www.ipcc.ch/sr15/

[21]https://www.unep.org/news-and-stories/story/carbon-offsets-are-not-our-get-out-jail-free-card

[22]https://www.mckinsey.com/business-functions/sustainability/our-insights/sectors-are-unevenly-exposed-in-the-net-zero-transition

[23]https://researchbriefings.files.parliament.uk/documents/CBP-8826/CBP-8826.pdf

[24]https://www.lexology.com/library/detail.aspx?g=9186aa5b-57d7-4f8d-939a-2465be903c56