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Raising the Green Standard:

Evaluating the University of St Andrews' Sustainability Measures

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EXECUTIVE SUMMARY

Amid the escalating climate crisis, universities are compelled to incorporate sustainability into their strategies. This paper aims to assess the effectiveness of the sustainability initiatives at the University of St Andrews through a comparative analysis, contrasting these measures with those implemented at the University of Edinburgh and the University of Glasgow.

By selecting *greenspace and conservative actions, carbon emissions and energy,* and *recycling* as our primary focus areas for comprehensive evaluation of the strategies employed by the mentioned universities, it becomes evident that while the University of St Andrews aligns with its Scottish counterparts in achieving carbon neutrality and expanding recyclable items, there is room for improvement in the greenspace and conservation actions domain. Notably, wildlife conservation efforts appear limited in scale and number, indicating an area that requires further attention and enhancement.

To redress such issue and further enhance its initiatives as a whole, we outline three recommendations for raising the green standards at St Andrews:

1. **Despite the commitment to net-zero goals, the current green policy relies on smaller-scale initiatives with limited digital analysis. Introducing tools like mobile apps and data monitors provides a transformative avenue for sustainability engagement.**
2. **Adopting a comprehensive, long-term,and multidimensional approach is crucial. St Andrews should find a balance between crafting a comprehensive vision and channeling focused efforts, particularly in carbon emission management, which ensures commitment to long-term sustainability while providing flexibility for exploring new avenues within a targeted framework.**
3. **The university should prioritize enhanced collaboration and communication. Despite ongoing campaigns, persisting challenges, like lower-than-expected recycling rates, necessitate attention. Bridging the attitude-behaviour gap is vital, and collaboration with student societies and local organizations, especially entities like *Transition*, can foster cross-level cooperation.**

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1.0 INTRODUCTION

In 2023, we are witnessing an unprecedented number of climate-related records set globally. The rapid rate of transformation has taken scientists by surprise, raising alarms about the perils posed by extreme weather events, precarious climate feedback loops, and the threat of reaching a critical tipping point in the trajectory of climate change earlier than anticipated (Armstrong McKay et al., 2022). For instance, findings by Ripple et al. reveal that the period from June to August 2023 registered the highest temperatures ever documented globally. In early July, we observed the Earth's all-time highest global daily average surface temperature, potentially marking "the warmest recorded temperature on our planet in the last 100,000 years" (Ripple et al., 2023). This acuteness of the climate crisis was reflected in a speech delivered by United Nations Secretary-General António Guterres during a climate discussion at the United Nations General Assembly in September. In his address, Guterres urged countries to tackle the pressing climate emergency, emphasising that "we cannot afford the same old broken record of scapegoating and waiting for others to move first" (Frost, 2023). We are undoubtedly entering uncharted territory as we edge our planet's atmosphere and environment toward precarious instability.

The spiraling climate situation accentuates the importance of sustainability in mitigating the impacts of climate change on the environment. As articulated by the *Intergovernmental Panel on Climate Change (IPCC),* the concept of 'climate resilient development', characterised by the integration of strategies to adapt to climate change and efforts to curtail greenhouse gas emissions, takes on paramount importance in the battle against climate change (IPCC, 2023). The choices made in the coming years will hold a pivotal role in determining our collective future, as the pursuit of sustainable development becomes progressively more challenging with each increment of global warming. Hence, sustainability has evolved into an essential component for all types of organisations, including universities, influencing not only employee, staff, and student support but also shaping investment choices. For instance, the University of St Andrews has undertaken a series of commendable initiatives throughout the years, including establishing a biomass plant in 2017 to source energy in an environmentally responsible manner and launching the *Environmental Sustainability Board (ESB)* in 2020 (University of St Andrews, 2023). These initiatives are aligned with the university's ambitious goal

of achieving net-zero emissions by 2035 (University of St Andrews, 2023). This paper seeks to assess the impact and efficacy of these initiatives.

This report starts with a comprehensive review of the existing literature that underscores the university-sustainability nexus. Subsequently, a methodology section will outline the analytical approaches employed by our researchers. The subsequent section will feature a comparative analysis of the sustainability initiatives at the University of St Andrews, the University of Glasgow, and the University of Edinburgh, with the goal of assessing their effectiveness in tackling climate-related challenges. Lastly, the paper will conclude by providing recommendations for further initiatives to be undertaken by the University of St Andrews.

2.0 THE ROLE OF HIGHER EDUCATION IN SUSTAINABILITY

In the context of climate change, sustainability can often be referred to as the transformation of our energy, transportation, and other systems to mitigate their impact on global warming. Nonetheless, the concept extends beyond merely preventing climate change. As explained by MIT's Director of Sustainability, Julie Newman, sustainability encompasses a broader scope that includes the interaction between people and the environment, spanning areas such as "resource extraction, responsible disposal, and conscientious usage" (Tso, 2021). Thus, seen through an environmental lens, sustainability focuses on our utilisation of Earth's resources and the manner in which we manage them, with a primary emphasis on avoiding the depletion of the planet's available resource supply. Moreover, a shared core principle in sustainability lies in the consideration of the repercussions of our current actions on the world tomorrow. This principle aligns with the United Nations' concept of 'sustainable development', which is characterised as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 2023). In this regard, sustainability transcends environmental aspects and looks at economic well-being, accessibility to essential resources like water and food, education, and other factors that collectively enhance individuals' quality of life.

With sustainability being important in the fight against the deteriorating climate situation, organisations, including universities, are now integrating sustainability into their long-term strategies. Universities play a key role in advancing environmental sustainability by educating future leaders, conducting critical research, and implementing sustainable practices in their own communities. Gregory Crawford, a Forbes Councils Member, proclaims that universities hold a vital position to tackle global and local challenges by "shaping diverse mindsets, enhancing scientific and technical expertise, and fostering opportunities for innovative practices" (Crawford, 2021). Similarly, Fiona Goodwin, a director at the *Environmental Association for Universities and Colleges,* emphasises that due to the substantial geographic footprint of universities, the sustainability measures they implement on their campuses to reduce greenhouse gas emissions have an impact on their "local vicinity, their country and globally" (The Guardian, 2020).

Additionally, many students factor in an institution's stance on climate action when making their application choices. As per research by *Times Higher Education,* prospective international students prioritise a university's dedication to sustainability over its geographic location (Bothwell, 2021). This trend is hardly surprising given the findings of a global survey in *The Lancet,* which indicated that nearly half (45%) of individuals aged 16 to 25 are suffering from climate anxiety (Hickman et al., 2021). Therefore, it is only logical for them to seek educational institutions that align with their aspirations for a sustainable future. With sustainability being an important factor in attracting students, institutions are required to demonstrate that they are taking genuine, targeted climate action. For instance, the University of California, Berkeley, which holds the top spot in the *QS Sustainability Rankings,* has formulated an ambitious and comprehensive sustainability plan which encompasses a broad spectrum of goals, including, but not limited to, travel, buildings, health, research and energy (UC Berkeley, 2023). These initiatives collectively advance the overarching goal of achieving 'net zero', an objective pursued by every university that entails the aspiration to mitigate greenhouse gas emissions responsible for global warming by effectively balancing the amount released into the atmosphere with the amount removed and stored by carbon sinks. According to Kyriacou and Burke, achieving 'net zero' would limit global warming to 1.5 degrees, as laid out in the 2015 Paris Agreement, and would require "rapid, deep and sustained reductions in global greenhouse gas emissions" (Kyriacou and Burke, 2021) to attain such a proposition.

Released in April 2022, the Department for Education unveiled a policy paper on sustainability and climate change, outlining a vision for the United Kingdom to become a global leader in sustainability and climate change education by 2030. One of the ways in which this can be attained is by "preparing all young people for a world impacted by climate change through learning and practical experience" (Department for Education, 2022). In this context, universities serve as vital agents in realising the objectives set forth by the Department for Education. They play a crucial role in equipping future professionals with the necessary competencies to become responsible citizens of a sustainable future, fostering a perspective that encourages thoughtful consideration of their own behaviours and actions. For Crawford, sustainability excellence entails providing every student in every discipline with a foundational education that empowers them to be effective participants in this key domain (Crawford, 2021). For instance, this education may encompass a liberal arts component, which encourages students to

ponder a broad spectrum of questions related to the consequences of their decisions and actions on others. Thus, the incorporation of sustainability principles into education curricula represents a significant undertaking for higher education. According to Kioupi and Voulvoulis, this endeavour necessitates the adoption of a 'Whole Systems Approach', which starts with the formation of a common sustainability vision that engages all higher education stakeholders. It continues by establishing the curricula, pedagogies, educator training programs, and learning environments "that will enable learners to develop the competences for such a vision to realise, while making interconnections between all aspects of the organisational and operational structure of the institution" (Kioupi and Voulvoulis, 2022).

Moreover, universities are a natural locus for research and scholarship, often transcending disciplinary boundaries on myriad issues surrounding environmental sustainability and effective implementation. They are often regarded as societal 'test-beds' for sustainability, where they transform their entire campus into a dynamic testing ground. Here the institution collaborates with private, public, and NGO partners to "explore, research, instruct, implement, and disseminate insights, innovations, and policies" (Waghorn, 2012). Thus, university research is pivotal for sustainability as it drives innovation, informs policy, and develops solutions to address pressing environmental and societal challenges.

3.0 METHODOLOGY

As previously implied, a comparative approach will be the main methodology applied in this research paper to analyse the effectiveness of St Andrews' sustainability initiatives in tackling the climate issue. Using this method allows for benchmarking by comparing the performance of various initiatives. Thus, we have chosen to compare St Andrews with two of its fellow Scottish universities: the University of Glasgow and the University of Edinburgh. The reasons for choosing these domestic universities are trifold.

1. Universities in the same region may have access to the same local resources, suppliers, and regulatory frameworks, which can make it easier to assess the role of resource availability and constraints in shaping sustainability efforts.
2. Those located in the same geographic area often face similar environmental challenges and opportunities. For instance, they may share the same climate and potential risks including natural disasters. This commonality allows for a more direct comparison of the impact of sustainability initiatives in a particular environmental context.
3. Both Glasgow and Edinburgh are esteemed institutions, recognized for their high standing in sustainability rankings. In the latest *QS World University Sustainability Rankings,* Edinburgh is ranked 4th overall out of 700 universities globally while Glasgow is ranked 13th (QS, 2022). Meanwhile, St Andrews is in 143rd place (QS, 2022). Although inconsistencies in the way sustainability is understood and applied can be spotted, "bringing into questions the merits of ranking lists as a meaningful sustainability reporting tool" (Patara and Dhalla, 2022), sustainability rankings are gaining prominence as social responsibility performance becomes an integral determinant of an institution's worth encompassing intangible assets such as reputation, legitimacy, and credibility (Mustapha, 2022).

Consequently, choosing universities within the same area for comparing sustainability initiatives provides a contextually relevant and informative basis for analysis as it allows for a more precise evaluation of the impact of common environmental and regulatory conditions on sustainability efforts. Moreover, with St Andrews ranked lower in sustainability compared to its peers in Scotland, adopting a comparative analysis helps identify best practices and areas for improvement by examining what has worked well in similar contexts and applying these lessons to St Andrews.

4.0 ANALYSIS

4.1 Greenspace and Conservation Action

Considering that the Universities of St Andrews, Edinburgh, and Glasgow aim to reach net zero emissions by 2035, 2040, and 2030, respectively, environmental restoration and conservation is crucial to fulfilling these ambitions (University of St Andrews, 2023).

4.2 Land Conservation and Greening

a. University of St Andrews

At the University of St Andrews, the Biodiversity Action Plan has advocated for a reduction in the degradation of natural habitats and the loss of biodiversity (University of St Andrews, 2022). The University is on track to fulfill these objectives. The Biodiversity Working Group has spearheaded action (University of St Andrews, 2023), cumulatively completing 20 projects and initiating 40 more in the 2021-22 academic year (University of St Andrews, 2022). For instance, the NatureScot grant-funded Meadows in the Making project has converted 5 hectares of grassland to meadow, ultimately producing 0.86 hectares of new woodland and 2,600m of hedgerow (University of St Andrews, 2022). Collaborators include St Andrews Botanic Gardens, Fife Coast & Countryside Trust, Fife Council and Crail Community Partnership (University of St Andrews, 2022).

This progress reflects that the University is on track to reach its goal of transforming over 60% of the institution's managed land for biodiversity (Transition, 2023). The University attributes the success of the programme to collaborative efforts between an Ecologist within the University Estates team and a practical conservation worker from the Grounds team, which enabled efficient decisions (University of St Andrews, 2022). Active habitat infrastructure creation contributes to both biodiversity and carbon sequestration, aligning the university action with its goal of net zero by 2035 (University of St Andrews, 2023). Carbon sequestration refers to the capture and storage of carbon dioxide (CO2) to reduce the levels of this greenhouse gas in the atmosphere (University of Edinburgh, 2023). Beyond Meadows in the Making, commitment to nature conservation and greening remains consistent. The Green Corridors project has planted 500 trees since 2020 (University of St Andrews, 2023), 11 litter picks of a total of 232kg in the 2022-23 academic year (Transition, 2023), and the St Andrews Forest works to sequester 20,000 tonnes of carbon per year (University of St Andrews, 2023). Each project reinforces a

University-wide commitment to carbon offsetting, ecosystem services (clean air and water), and promotion of biodiversity (University of St Andrews, 2022). Therefore, the current policy in St Andrews is characterised by several smaller-scale projects that set St Andrews on an apt trajectory for net zero emissions by 2035.

b. University of Edinburgh

The University of Edinburgh's work in the conservation and creation of green spaces is comparatively extensive. Large-scale land conservation, similar to that of the University of St. Andrews, is mirrored in the Drumbrae project. The 431 hectares of land at Drumbrae are the first of multiple sites that are being transformed into woodland (The University of Edinburgh, 2023). The project is still in the process of public consultation and has yet to gain approval from the Scottish Forestry (The University of Edinburgh, 2023). Nevertheless, buying local land to mitigate carbon emissions from travel is a useful blueprint for how universities can balance global outreach with net zero emission targets (The University of Edinburgh, 2023).

On campus, in its Pollock halls and Kings Buildings, the University and its volunteers maintain orchards, while the Easter Bush campus keeps 24 vegetable plots (The University of Edinburgh, 2023). While smaller in scale, these projects facilitate greening even in urban spaces. The Green Communities programme, a part of the University's contribution to the Thriving Green Spaces project, has enabled student and staff participation in the greening of Edinburgh (The University of Edinburgh, 2023). For instance, in tree planting initiatives and the Green Infrastructure Mapping Pilot Project (The University of Edinburgh, 2023). The latter uses a mobile app and ongoing community engagement to measure the quality of parks and ultimately improve upon biodiversity and conservation (The University of Edinburgh, 2023). Similar digital means were not mentioned in St Andrew's conservation strategy, and are an effective mechanism for using public engagement to reduce the University's costs of monitoring green spaces. The first phase of the umbrella project 'Thriving Green Spaces', in collaboration with the City of Edinburgh, ended in autumn 2022 and had a £1.3 million budget (The City of Edinburgh Council, 2023). Alongside the Green Infrastructure mapping tool, Masters and PhD students from the University's School of Architecture and Landscape Architecture helped design project plans (OpenSpace, 2023). Therefore,

the large-scale purchase and conservation of Scottish land, the application of digital tools, and a collaborative approach define the University of Edinburgh's strategy.

c. University of Glasgow

The University of Glasgow's success in global sustainability rankings is indicative of its excellence in land conservation and greening (University of Glasgow, 2023). Akin to the University of Edinburgh's Drumbrae project, Glasgow's Cochno farm is composed of 344 hectares of land (University of Glasgow, 2023). Although Cochno is primarily designed as a research and education facility, it simultaneously contributes to the University's bid for net zero emission by 2030 (University of Glasgow, 2023). Therefore, Glasgow's dual commitment models how educational institutions can balance long-term goals of environmental conservation with ambitions of research excellence.

Ongoing action to maximise conservation is mirrored in the Biodiversity Strategy and Action plan, which forefronts the re-establishment of gardens, the expansion of woodlands at Garscube Campus and Cochno farm (University of Glasgow, 2023), coupled with the re-launch of the iNaturalist project that uses staff and student engagement to map flora and fauna on campus (University of Glasgow, 2022). Similarly, GALLANT, the University-led programme, works to use formerly derelict and polluted land for carbon sequestering and transform river edge land into parks (University of Glasgow, 2023). Using £10 million from the Natural Environment Research Council, the project functions as a 'living lab' that trials sustainable solutions while providing trade-offs for public health, wellbeing, and the economy (University of Glasgow, 2023). This project demonstrates that, subject to limitations on conservation funding, universities can partner with more lucrative organisations to use research and academic expertise to transform their ambitions into action. To create a mutually beneficial relationship with the city of Glasgow and funders, the University leveraged co-benefits within their sustainability projects. For instance, regenerating derelict land into sites of both carbon-capture and community recreation, including bike paths (University of Glasgow, 2023). Overall, the University of Glasgow's success is rooted in its conservation of substantial hectares of land, several smaller-scale projects, and substantial financial backing.

4.3 Wildlife Conservation

a. University of St Andrews

In St Andrews, the University's Biodiversity Working Group spearheads efforts of monitoring species and managing habitat infrastructure (University of St Andrews, 2023). Currently, the University hosts an annual BioBlitz, in which participants survey biodiversity, building the foundation for action against invasive species (University of St Andrews, 2023). Similarly, the University has a Bronze Accreditation for being a Hedgehog Friendly Campus, achieved through a litter-free habitat, with food, water and shelter (Bowey, 2023). Although these actions effectively shield endangered wildlife, projects remain small in scale and few in number (Transition, 2023).

b. University of Edinburgh

The University of Edinburgh's work on wildlife conservation parallels that of St Andrews. Edinburgh's BioBlitz emulates St Andrew's fauna campus mapping while also incorporating the iNaturalist app (The University of Edinburgh, 2023). With this additional digital tool, staff and students can upload data and identify species (The University of Edinburgh, 2023). Throughout the year, in collaboration with EDINA, the Estates Department, the Department for Social Responsibility and Sustainability and the Scottish Wildlife Trust, the app remains in use, enabling complete mapping of biodiversity values around campus (The University of Edinburgh, 2023). Analogous to the University of St Andrew, Edinburgh has pursued becoming a hedgehog-friendly campus, even attaining Gold Accreditation through surveying and monitoring hedgehog populations and actively improving green spaces for hedgehogs (The University of Edinburgh, 2023). Edinburgh therefore stands out from St Andrews in its use of technology to increase the accessibility and scale of its wildlife conservation projects.

c. University of Glasgow

The University of Glasgow's Biodiversity Strategy and Action Plan has, alongside its Silver Accreditation as a Hedgehog Friendly Campus, forefronted the conservation of several species (University of Glasgow, 2023). Annual bird, bat, mammal, and invertebrate surveys inform improvements in biodiversity management (University of Glasgow, 2022). Ultimately, then, the University is unique in its more structured management of wildlife.

4.4 Carbon Emissions and Energy

a. University of St Andrews

The University of St Andrews is actively pursuing a comprehensive strategy to achieve carbon neutrality. The university is focused on driving down carbon emissions through a combination of behavioural change, investment in sustainable systems, and collaborative efforts with societal partners. The plan includes several key initiatives that encompass enhancing the efficiency and utilisation of the university's estate, reducing the carbon footprint associated with business travel, and emphasising sustainability in construction activities. The expectation is for a significant strengthening of the local energy network, including power storage, and a substantial transition to greener grid electricity by 2035.

To meet this increased demand for non-fossil fuel power, local generation solutions like wind, solar, and biomass may be implemented (University of St Andrews, 2022). Furthermore, the university aims to eliminate natural gas as a heating source, either through biomass, alternative green fuels, or electrification, all while maximising building space efficiency and maintenance. Efforts to reduce carbon emissions extend to transportation, where collaboration with the community and partners will enhance public transport options. The institution is also actively working on sustainable procurement practices and expects society to contribute to a 25% reduction in carbon emissions across all emission sources by 2035 (University of St Andrews, 2023). To offset any remaining emissions, the university will engage in nature-based carbon sequestration activities, such as the St Andrews Forest, and develop carbon capture technologies (University of St Andrews, 2023). Renewables like the 1MW solar farm and the biomass plant already play significant roles in reducing carbon emissions. An Estate Masterplan, district heat network expansion, and the Fusion Project with Scottish Power Energy Networks further highlight the university's commitment to carbon neutrality (University of St Andrews, 2022).

b. University of Edinburgh

The University of Edinburgh has articulated a clear and defensible position regarding carbon sequestration and carbon offsetting in alignment with its commitment to become a net-zero university by 2040 (University of Edinburgh, 2023). In pursuit of this goal, the

university emphasises the importance of addressing a wide scope of emissions, which encompasses not only energy use but also business travel, staff and student commuting, and student travel by plane outside term time (University of Edinburgh, 2023). The university has recognized the importance of carbon sequestration in mitigating climate change.

The University of Edinburgh's view is that credible climate action necessitates addressing all major impacts on carbon emissions, while also taking steps to reduce carbon in its procurement practices. The university's approach to accounting for carbon emissions involves distinguishing between "gross carbon" emissions (in-scope) and "net carbon" emissions (University of Edinburgh, 2021). The latter accounts for any carbon sequestration deemed acceptable, reflecting a commitment established since 2016 to invest in carbon sequestration as part of the pathway to achieving a net-zero status by 2040. The criteria guiding the university's calculations of net emissions include adherence to best practice guidelines, prioritising emissions reduction at the source, ensuring emissions savings are genuine and additional, and considering a range of sustainability factors beyond mere carbon reduction (University of Edinburgh, 2021).

In line with its commitment to deep engagement with climate issues, the University of Edinburgh recognises that the direct cessation of fossil fuel use and the minimisation of energy demand are the most effective approaches, with some exceptions for activities such as aviation. While the university acknowledges that certain offsetting approaches may have benefits, it remains cautious about their credibility, particularly in the context of climate science. Given the above considerations, the University of Edinburgh has opted for an approach that focuses on direct carbon sequestration, conducted within the institution's own scope of activities, or in active partnership with relevant entities. This approach rules out transactional, market-based approaches, such as Power Purchase Agreements (PPAs) and investment-led purchases of shares or funds in favour of quality, additionality, credibility, and co-benefits, aligning with its commitment to meeting net-zero emissions targets through robust, accountable means (University of Edinburgh, 2021).

c. University of Glasgow

The University of Glasgow has made notable progress in reducing its carbon footprint in recent years, showcasing a commitment to environmental sustainability. From 2015 to 2019, the university's carbon footprint was marked by a substantial reduction of 13.27%; it stood at 69, 591 tCO2e in 2015, and, by 2019, had decreased to 60,358 tCO2e (University of Glasgow, 2023). These figures encompass not only Scope 1 (direct) and Scope 2 (indirect) emissions but also include some Scope 3 emissions related to business travel. This decrease is largely attributed to enhanced efficiency resulting from the implementation of the Combined Heat & Power (CHP) system and the decarbonisation of the national grid (University of Glasgow, 2023). These measures have been instrumental in curbing the university's carbon emissions. Consultants have projected that if the University of Glasgow were to maintain its pre-Covid-19 trajectory, the carbon footprint would rise to 75,366 tCO2e by 2045 (University of Glasgow, 2023). However, the university has identified a series of actions to counteract this projection to reduce and maintain a level of 32,000 tCO2e by 2035. Key actions outlined to achieve these carbon reduction goals include energy efficiency improvements in specific buildings, which are projected to lower emission by 4,200 tCO2e over a decade. Additionally, plans involve the installation of Water Source Heat Pumps (WSHP) at the Garscube Campus in 2025 (anticipated to displace 2,375 tCO2e) and Gilmorehill in 2030 (expected to displace 3,800 tCO2e), along with the deployment of Air Source Heat Pumps in eligible standalone buildings to bolster energy efficiency. Finally, the university aims to introduce solar panels in certain locations to enhance renewable energy generation (University of Glasgow, 2023).

Carbon offsetting, characterised by real and verifiable carbon credits, not only aligns with the university's sustainability goals but also offers tangible benefits. Collaboration within the higher education sector, as exemplified by organisations like the Alliance for Sustainability Leadership in Education (EAUC), seeks to customise offsetting practices, connecting them seamlessly to academic activities and emphasising benefits for local biodiversity and communities (University of Glasgow, 2023). To ensure financial viability of achieving net carbon neutrality by 2030, the university will incorporate the associated costs into its financial and capital plans. Acknowledging the potential for changing circumstances, the university remains committed to its goals while remaining flexible in the means of achieving them. Regular monitoring of the financial implications of various

interventions will allow for adjustments and reviews as necessary, ensuring a dynamic and adaptive approach to carbon neutrality.

The University of St Andrews, the University of Glasgow, and the University of Edinburgh each exhibit unique approaches to address carbon emissions and energy sustainability. The University of St Andrews strongly emphasises a multidimensional strategy involving behavioural changes, investment in renewable systems, and offsetting. The university aims to achieve net zero by 2035, with a focus on offsetting through nature-based carbon sequestration projects and carbon capture technologies. In contrast, the University of Glasgow has made significant progress in reducing emissions through improvements in efficiency and infrastructure. Their approach involves both short-term emissions reductions and a long-term strategy to achieve a significant carbon footprint reduction by 2035. They also plan to incorporate offsetting measures to reach their net carbon neutrality goal by 2030. The University of Edinburgh takes a distinctive approach, focusing primarily on direct carbon sequestration. They consider the wider aspects of committing to sustainability and encourage deep engagement with climate issues among the student body. While they are committed to a net zero target by 2040, they do not appear to invest significantly in renewable energy sources. Overall, the three universities share a common commitment to carbon reduction and sustainability, but adopt different strategies to reach their goals.

4.5 Recycling

Recycling serves as a key component of sustainability practices on university campuses. As knowledge about the impacts of recycling continues to develop, it is becoming clear that certain factors easily influence behaviours around waste. Largo-Wight et al. (2013) found that by simply increasing the amount of recycling receptacles inside of campus buildings, the volume of can and bottle recycling increased dramatically. Alongside upgrading facilities to include more opportunities for recycling, increasing general knowledge on the importance of separating recyclables can play a key role in the practice's efficacy. Around the world, universities are seeing major issues with waste separation amongst university members (Bm, 2018; Nottingham Trent University; Árnadóttir et al., 2019). Reports on these campus issues give universities clear areas of improvement, eventually bettering recycling habits amongst community members and decreasing their impact on environmental degradation.

a. University of St Andrews

The University of St Andrews' 2021-2022 Sustainability Report indicates that the amount of waste being sent to landfill decreased dramatically, with waste sent to landfill accounting for 5.4 tonnes of carbon dioxide emissions in 2021-2022 compared to 863 tonnes in the previous year. The number of emissions from recycled waste was 19.27 tonnes, an increase from the previous years, yet lower than previous averages before the Covid-19 pandemic (The University of St Andrews, 2022, 16). The recycling rate was not released in the most recent report; however, in 2020-2021, the rate was 31% (The University of St Andrews, 2021, 5). The University has undertaken multiple campaigns to promote recycling. One such campaign involved becoming a plastic-free campus by avoiding plastic straws and single-use cutlery and packaging in all University spaces. Vegware, compostable single-use cutlery, is now used throughout the University's cafes and at events (The University of St Andrews, 2022, 6). The University also moved to a more centralised recycling system through the 'Bin the Bin' initiative, where individual desk bins were removed and replaced by communal bins in the hopes of increasing the University's recycling rate and community consciousness around recycling. The communal bins allow for sorting, separating paper, general waste, food waste, and a category including cardboard, cans, tins, cartons, and plastic bottles.

Out of the three universities studied, The University of St Andrews has the widest range of items able to be recycled. At the University, students can recycle most plastic items, cartons, food and drink cans, paper and cardboard, mixed glass, food waste, paper and card, coffee cups, lids, plastic bottles, and yoghourt pots. There is no requirement to clean food or drink packaging before recycling. Dry mixed recycling can also take items such as energy bar and crisp packets (The University of St Andrews). Students can also dispose of goods through the StAnd Reuse programme, which collects household items throughout the year and redistributes them to students, households in need, and local charitable organisations (St Andrews Environmental Network).

b. University of Edinburgh

The University of Edinburgh aims to be a zero waste university by 2030 (University of Edinburgh). The University's recycling and composting rate for the Academic Estate was 56% in the 2020-2021 year. From 2016 through 2021, the recycling and composting rate for the Academic Estate was between 52-56%. To realise the University's goal of 80%,

intensive changes to the Edinburgh community's recycling habits would be needed. The University saw a reduction in the amount of waste per capita produced during the Covid-19 pandemic, but this decline was likely due to a decrease in campus activity during the height of the pandemic (University of Edinburgh). The pre-pandemic waste per capita was 65 kilograms, with the University's goal set at a 10% reduction from the 2016-2017 rate, which was 73 kilograms. During the peak of the pandemic, waste per capita was 47 kilograms in 2019-2020 and 35 kilograms in 2020-2021 (University of Edinburgh, 2021). For 2022-2023, the target is set back to 66 kilograms, which should be attainable since the University already reached this goal before the pandemic (University of Edinburgh). The University allows for dry mixed recycling, including items such as cardboard, glass, rinsed plastics, rinsed metal, paper, and card. Unlike the University of St Andrews, all food and drink items must be washed. Coffee cups cannot be recycled (University of Edinburgh, 2022). Through its TerraCycle system, the University gives community members the ability to recycle 'unusual items,' such as crisp and biscuit packets, stationary, pens, toothbrushes, and toothpaste. TerraCycle recycling points can be found across the Estate, correlated to different items depending on the location (University of Edinburgh, 2022). The accessibility to various forms of recycling through the university's TerraCycle program is one of its strengths in its recycling practices, allowing community members to find sustainable ways to get rid of their uncommon waste.

c. University of Glasgow

The University of Glasgow releases an annual sustainability report similar to that of the University of St Andrews. The 2021-2022 report emphasised that there were 304 tonnes of carbon dioxide emissions associated with waste in that year, a 40% reduction from the 2019-2020 year (University of Glasgow, 2020). The introduction of the University's Waste Management Strategy and Action Plan sets a goal of reaching a 70% recycling rate by 2027 and having zero waste go to landfill by 2030. Beginning in 2022, the University annually assessed its progress in reaching these goals through the creation and observation of smaller objectives.

There has been limited progress in upgrading internal facilities to significantly impact the University's recycling rate. Reducing the amount of waste to landfill and maximising at source recycling have both been unsuccessful thus far (University of Glasgow, 2022). Looking at this limited progress in major areas, it seems unlikely the university will reach

its goals on time. Although there are many areas still to be improved upon, the University has been successful in clearly communicating how to dispose of or recycle various items, an important component to making the shift from recycling to recycling effectively. In the past, the University has received negative feedback on the effectiveness of its recycling procedure, as students did not sort their recycling correctly when placing items into bins (Bm, 2018). Through its 'Can I Recycle…' website page, students and staff can find ways to avoid waste (University of Glasgow). The website outlines recycling and garbage categories, but also opportunities to engage with WARPit, an online portal where students and staff can list items to be redistributed to other community members. At the University, students can recycle dry mixed recycling items, such as paper, empty cans, plastic bottles, card, and cardboard. These items cannot be contaminated with food or drink, meaning they must be washed. Coffee cups cannot be recycled (The University of Glasgow). The University should thus work to increase the types of items that can be recycled.

All three universities have been making strides in their sustainability efforts; however, the Covid-19 pandemic forced changes to campus recycling procedure, stunting development in this area. The universities have optimistic timelines for their goals in sustainability, but most progress has been limited. Moving forward, the Universities of St Andrews, Edinburgh, and Glasgow must prioritise finding ways to educate community members about the importance of recycling and recycling effectively while making tangible changes to recycling infrastructure.

5.0 RECOMMENDATIONS

Approaches to sustainability are varied and complex in nature and it is impossible to come up with a definitive solution or optimal method for addressing this challenge. It is important for institutions to re-evaluate their current strategies critically and incorporate insights gained from other institutions. Previous sections of the research paper examine how the University of St Andrews, University of Edinburgh, and University of Glasgow approach sustainability. In order to compare their strategies effectively, greenspace and conservation actions, carbon emissions and energy, and recycling are chosen as three key areas for comparison. Despite the shared geographic location and regulatory frameworks experienced by these institutions, each university has implemented distinct approaches for addressing sustainability challenges. This presents an invaluable opportunity for universities to assess their existing regulations, collaborate on shared perspectives, and gain insights from one another in order to make improvements.

This research provides a holistic view for the University of St Andrews to evaluate the effectiveness of its existing sustainability measures and contribute to the enhancement of the green standard on a wider scale. Thus, this paper outlines three key recommendations for forthcoming green policies and initiatives to be implemented in St Andrews in the above areas.

Firstly, there is a pressing need to enhance the integration of digital tools into green initiatives. Although the university is highly committed to achieving its net-zero goals, the current green policy in St Andrews is primarily characterised by several smaller-scale initiatives and local collaborative efforts. The effective utilisation of digital tools for efficient analysis is lacking within the existing framework. Harnessing the power of digital tools, such as the development of mobile apps and data monitors, can provide a transformative boost to the engagement of sustainability practices. For instance, the use of the mobile app designed by the University of Edinburgh in its Green Infrastructure Mapping Pilot Project is a great example of increasing public engagement. Such tools have the potential to streamline data collection, analysis and tracking of users' behaviour, and guide the future decision-making processes. Such tools can help accurately pinpoint areas where the university can optimise efforts and resources. Although the adoption of sustainable hardware technologies is more apparent in areas like carbon emission and energy, there is room for new perspectives through introducing

digitalisation as a tool in other areas. In addition, the development of mobile apps not only raises individual awareness but can also encourage community members to adopt sustainability practices and extend their influence beyond the institutional context (Al-Emran and Griffy-Brown, 2023). By effectively incorporating digital tools into the sustainability framework at the University of St Andrews, the university would boost its analytical capabilities while also fostering a culture of sustainability that extends beyond the campus.

Secondly, adopting a long-term, multidimensional, focused approach is essential for institutions to achieve sustainability. Through analysing the approaches adopted by the Universities of St Andrews, Edinburgh, and Glasgow, this paper reveals that while all institutions have well-established short-term and long-term goals, their priorities differ significantly. For instance, regarding carbon emission management, both the University of Glasgow and the University of St Andrews have embraced a more widespread and multifaceted approach which includes introducing renewables, utilising carbon captured technologies, and improving energy efficiency in campus buildings. In contrast, the University of Edinburgh has prioritised direct carbon sequestration and has explicitly ruled out transactional, market-based approaches through re-enacting agreements and promoting collaboration in procurement (University of Edinburgh, 2021). While it is impossible to define the 'optimal' approach, it is undoubtedly crucial that St Andrews maintains a commitment to long-term goals. Additionally, while delving deeper into existing focus areas is crucial, exploring new avenues for change is equally important. Striking a balance between building a comprehensive vision and targeted dedication to particular areas is pivotal in supporting net zero emissions goals.

Lastly, closer collaboration and clearer communication within the University of St Andrews is recommended. Despite the implementation of various campaigns and ongoing projects by all three universities studied, there has been limited progress and a lower than expected participation rate in some dimensions. For instance, the University of Glasgow faces challenges with a recycling rate that is lower than anticipated. The limited progress in upgrading facilities and raising students' engagement are contributing factors that raise concerns about whether recycling goals are achievable. Similar uncertainties also arise regarding the progress of the other two universities in different focus areas. Thus, gaining a deeper understanding of the attitude-behaviour gap and finding ways to mitigate this gap is crucial for navigating a seamless transition from sustainability initiatives to tangible behavioural changes among stakeholders

(Tölkes, 2018). This could potentially be achieved through having closer collaboration with student societies and local organisations. Notably, Transition has been playing a major part across universities in advocating for sustainability. A closer collaboration with Transition could boost more cross-level cooperation in project engagement and enhance the provision of guidance. In fact, many students have demonstrated a strong will to contribute to sustainability, but they lack clear guidance or motives to turn aspiration into action. Providing step-by-step guidance through student platforms and social media could inspire students to engage in sustainable activities, like recycling, and take part in student-led activities, such as second-hand goods exchanges. This could not only encourage a bottom-up approach in collaboration, but also cultivate a culture of sustainability on campus. Thus, a stronger focus in collective efforts is essential towards a more sustainable future in St Andrews.

6.0 CONCLUSION

The root cause of sustainability challenges lies in the complex and interconnected nature of multiple systems (Brønn and Brønn, 2018). Referred to as a wicked challenge, there isn't a definitive formulation or an immediate solution that can be proven to be successful in promoting sustainability (Rittel and Webber, 1973). Given the nature of such a challenge, new perspectives and multidimensional approaches are essential. While there may be strong incentives and spirit for driving transformational sustainable change, the task of translating this spirit into strategy can is far from straightforward. The implementation and execution of sustainability measures always entails grappling with uncertainty and complexity. Thus, institutional-level initiatives play an invaluable role by serving as the driving force behind transformative sustainability, both by engaging stakeholders, including faculty, staff, students, and local community members, and providing incentives for research in the broader academic landscape.

This research paper examines the sustainability initiatives adopted by the University of St Andrews, University of Edinburgh, and University of Glasgow in the areas of greenspace and conservation action, carbon emissions and energy, and recycling. Through adopting a comparative approach, this paper analyses the effectiveness of St Andrews' sustainability initiatives in tackling the climate issue. It highlights ongoing projects and sustainable approaches adopted by the three universities and concludes with three key recommendations for raising the green standards at St Andrews. Enhancing the integration of digital tools into green initiatives, adopting a long-vision, multidimensional, yet focused approach, and promoting closer collaborations through clearer communication could potentially drive progress towards sustainability. This paper encourages universities to regularly review their existing green initiatives and incorporate insights gained from other institutions. It is through shared knowledge and collective improvements that a sustainable future will be realised.

7.0 BIBLIOGRAPHY

Al-Emran, M. and Griffy-Brown, C. (2023). The role of technology adoption in sustainable development: Overview, opportunities, challenges, and future research agendas. Technology in Society, 73, p.102240. doi:https://doi.org/10.1016/j.techsoc.2023.102240.

Armstrong McKay, D.I., Staal, A., Abrams, J.F., Winkelmann, R., Sakschewski, B., Loriani, S., Fetzer, I., Cornell, S.E., Rockström, J. and Lenton, T.M. (2022). Exceeding 1.5°C Global Warming Could Trigger Multiple Climate Tipping Points. Science, 377(6611).

Árnadóttir, Á. et al. (2018) 'Waste Separation in Cafeterias: A Study among University Students in the Netherlands', International Journal of Environmental Research and Public Health, 16(1), p. 93. Available at: https://doi.org/10.3390/ijerph16010093.

Bm, P. (2018) Glasgow Uni recycling efforts fall short, GUEST audit finds, The Glasgow Guardian. Available at: https://glasgowguardian.co.uk/2018/02/17/glasgow-uni-recycling-efforts-fall-short-guest-audit-finds/ [Accessed: 30 October 2023].

Bothwell, E. (2021). Sustainability 'More Important than Location' for Mobile Students. [online] Times Higher Education (THE). Available at: https://www.timeshighereducation.com/news/sustainability-more-important-location-mobile-students.

Bowey, H., 2023. A Hedgehog Friendly Campus. [Online] Available at: https://environment.wp.st-andrews.ac.uk/a-hedgehog-friendly-campus/

Brønn, C. and Brønn, P. (2018). Sustainability: A Wicked Problem Needing New Perspectives. [online] Available at: https://biopen.bi.no/bixmlui/bitstream/handle/11250/2620663/Broenn_2019_Sustainability_AAM.pdf?isAllowed=y&sequence=4.

Crawford, G. (2021). Council Post: Powerful Ripples In The Environment: The Effects Of University Sustainability Action. [online] Forbes. Available at: https://www.forbes.com/sites/forbesbusinesscouncil/2021/09/02/powerful-ripples-in-the-environment-the-effects-of-university-sustainability-action/?sh=5fc3283d685e.

Frost, R. (2023). UN Chief Says Not All Leaders Are 'Feeling the Heat' of Climate Change. [online] Euronews. Available at: https://www.euronews.com/green/2023/09/19/a-sad-snapshot-drastic-action-needed-to-keep-paris-agreement-goals-alive-un-chief-warns#:~:text=%E2%80%9CWe%20must%20be%20determined%20to.

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R.E., Mayall, E.E., Wray, B., Mellor, C. and van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. The Lancet Planetary Health, [online] 5(12), pp.863–873. Available at: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00278-3/fulltext.

IPCC (2023). Urgent Climate Action Can Secure a Liveable Future for All — IPCC. [online] IPCC. Available at: https://www.ipcc.ch/2023/03/20/press-release-ar6-synthesis-report/.

Kioupi, V. and Voulvoulis, N. (2022). The Contribution of Higher Education to Sustainability: The Development and Assessment of Sustainability Competences in a University Case Study. Education Sciences, 12(6), p.406.

Kyriacou, G. and Burke, J. (2021). Why Is 'Net-Zero' So Important in the Fight Against Climate Change? [online] LSE Grantham Research Institute on Climate Change and the Environment. Available at: https://www.lse.ac.uk/granthaminstitute/explainers/why-is-net-zero-so-important-in-the-fight-against-climate-change/.

Largo-Wight, E., DeLongpre Johnston, D. and Wight, J. (2013) 'The Efficacy of a Theory-Based, Participatory Recycling Intervention on a College Campus', Journal of Environmental Health, 76(4), pp. 26–31.

Learn how to recycle effectively (2022) The University of Edinburgh. Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/sustainability-innovation-leadership/reducing-carbon-and-waste/zero-waste/learn-how-to-recycle-effectively [Accessed: 30 October 2023].

Mustapha, S. (2022). What is a sustainability index and why are they important? [online] Metrikus. Available at: https://www.metrikus.io/blog/what-is-a-sustainability-index.

Nottingham Trent University. Bin it right, Nottingham Trent University. Available at:

https://www.ntu.ac.uk/about-us/strategy/sustainability/our-impact/waste-and-recycling/bin-it-right [Accessed: 30 October 2023].

OpenSpace, 2023. Edinburgh's Thriving Green Spaces. [Online] Available at: https://www.openspace.eca.ed.ac.uk/projects/edinburghs-thriving-green-spaces/ [Accessed 24 October 2023].

Patara, S. and Dhalla, R. (2022). Sustainability reporting tools: Examining the merits of sustainability rankings. Journal of Cleaner Production, 366, p.132960.

QS (2022). QS Sustainability University Rankings 2023. [online] Top Universities. Available at: https://www.topuniversities.com/university-rankings/sustainability-rankings/2023.

Ripple, W.J., Wolf, C., Gregg, J.W., Johan Rockström, Newsome, T.M., Law, B.E., Marques, L., Lenton, T.M., Xu, C., Huq, S., Simons, L.A. and Anthony, D. (2023). The 2023 State of the Climate Report: Entering Uncharted Territory. BioScience.

Rittel, H.W.J. and Webber, M.M. (1973). Dilemmas in a general theory of planning. Policy Sciences, [online] 4(2), pp.155–169. doi:https://doi.org/10.1007/bf01405730.

Social and Civic Responsibility Plan (2020). The University of Edinburgh. Available at: https://www.ed.ac.uk/sites/default/files/atoms/files/social_civic_responsibility_delivery_plan_2020_to_2030_0.pdf.

Social and Civic Responsibility Report 2020-21 (2022). The University of Edinburgh. Available at: https://www.ed.ac.uk/sustainability/governance-publications-reports/reports/2020-21/we-will-become-zero-carbon-zero-waste/waste-and-reuse.

StAnd Reuse St Andrews Environmental Network. Available at: https://www.standrewsenvironmental.org/projects/stand-reuse [Accessed: 30 October 2023].

Sustainability Annual Report 2021-2022. University of Glasgow. Available at: https://www.gla.ac.uk/media/Media_894981_smxx.pdf.

Sustainability (For Students and Staff). University of Glasgow. Available at:

https://www.gla.ac.uk/myglasgow/sustainability/wasterecyclingreuse/ [Accessed: 30 October 2023].

The City of Edinburgh Council, 2023. Thriving Greenspaces. [Online] Available at: https://www.thrivinggreenspaces.scot/project. [Accessed 26 October 2023].

The Guardian (2020). 'All Universities Must Commit to net-zero by 2030': Tackling the Campus Climate Crisis. The Guardian. [online] 21 Aug. Available at: https://www.theguardian.com/education/2020/aug/21/all-universities-must-commit-to-net-zero-by-2030-tackling-campus-climate-crisis.

The University of Edinburgh, 2021. University Position on Carbon Sequestration and Carbon Offsets [Online] Available at: https://www.ed.ac.uk/sites/default/files/atoms/files/carbon_sequestration_-_positioning_paper.pdf. [Accessed 30 October 2023].

The University of Edinburgh, 2023. Carbon Sequestration [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/climate-strategy/carbon-sequestration. [Accessed 30 October 2023].

The University of Edinburgh, 2023. Drumbrae. [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/climate-strategy/carbon-sequestration/drumbrae. [Accessed 24 October 2023].

The University of Edinburgh, 2023. Edinburgh's Thriving Greenspaces. [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/biodiversity/edinburghs-thriving-greenspaces. [Accessed 24 October 2023].

The University of Edinburgh, 2023. Fauna Campus Mapping: Bioblitz. [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/biodiversity/fauna-mapping-bioblitz. [Accessed 24 October 2023].

The University of Edinburgh, 2023. Flora and Infrastructure Mapping: How Green is Your Campus?. [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/biodiversity/how-green-is-your-campus-project. [Accessed 26 October 2023].

The University of Edinburgh, 2023. Hedgehog Friendly Campus. [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/biodiversity/hedgehog-friendly-campus#:~:text=In%20January%202022%2C%20the%20University,and%20welcoming%20place%20for%20hedgehogs . [Accessed 27 October 2023].

The University of Edinburgh, 2023. Nature-Friendly Food Growing on Campus. [Online] Available at: https://www.ed.ac.uk/sustainability/programmes-and-projects/biodiversity/nature-friendly-food-growing-on-campus. [Accessed 25 October 2023].

Transition, 2023. Hedgehog Friendly Campus. [Online] Available at: https://transitionsta.org/2020/11/hedgehog-friendly-campus/. [Accessed 25 October 2023].

Transition, 2023. Litter Picks. [Online] Available at: https://transitionsta.org/sharing/litter-picks/. [Accessed 26 October 2023].

Transition, 2023. Meadows in the Making. [Online] Available at: https://transitionsta.org/greenspace/meadows-in-the-making/. [Accessed 26 October 2023].

Tso, K. (2021). What Is ‘Sustainability’? Is It the Same Thing as Taking Action on Climate change? [online] MIT Climate Portal. Available at: https://climate.mit.edu/ask-mit/what-sustainability-it-same-thing-taking-action-climate-change.

Tölkes, C. (2018). The role of sustainability communication in the attitude–behaviour gap of sustainable tourism. Tourism and Hospitality Research, 20(1), p.146735841882008. doi:https://doi.org/10.1177/1467358418820085.

UC Berkeley (2023). Sustainability Planning | Sustainability & Carbon Solutions. [online] UC Berkeley. Available at: https://sustainability.berkeley.edu/plans-reports/sustainability-planning.

United Nations (2023). The Sustainable Development Agenda. [online] United Nations Sustainable Development. Available at: https://www.un.org/sustainabledevelopment/development-agenda/.

University of Glasgow, 2022. Biodiversity Strategy and Action Plan (2022-2027), Glasgow: University of Glasgow.

University of Glasgow, 2023. £10 Million Research Hub to Boost Glasgow's Transition to Climate Resilience. [Online] Available at: https://www.gla.ac.uk/news/archiveofnews/2022/february/headline_835064_en.html. [Accessed 23 October 2023].

University of Glasgow, 2023. A Requirement for Carbon Offsetting [Online] Available at: https://www.gla.ac.uk/myglasgow/sustainability/glasgowgreen/arequirementforcarbonoffsetting/. [Accessed 29 October 2023].

University of Glasgow, 2023. Awards and Rankings. [Online] Available at: https://www.gla.ac.uk/explore/awardsandrankings/sustainability-rankings/#:~:text=QS%20Sustainability%20Rankings%202023,the%20QS%20World%20Sustainability%20Rankings. [Accessed 25 October 2023].

University of Glasgow, 2023. Carbon Management Plan [Online] Available at: https://www.gla.ac.uk/media/Media_870287_smxx.pdf. [Accessed 29 October 2023].

University of Glasgow, 2023. Cochno Farm Open Day. [Online] Available at: https://www.gla.ac.uk/schools/bohvm/about/news/headline_969072_en.html. [Accessed 24 October 2023].

University of Glasgow, 2023. GALLANT - Glasgow as a Living Lab Accelerating Novel Transformation. [Online] Available at: https://www.gla.ac.uk/research/az/sustainablesolutions/ourprojects/gallant/ [Accessed 20 October 2023].

University of Glasgow, 2023. The Current Position [Online] Available at: https://www.gla.ac.uk/myglasgow/sustainability/glasgowgreen/thecurrentpositio/. [Accessed 29 October 2023].

University of Glasgow, 2023. Glasgow Green: The University of Glasgow's Response to the Climate Emergency. [Online] Available at: https://www.gla.ac.uk/myglasgow/sustainability/glasgowgreen/additionalinterventions/. [Accessed 23 October 2023].

University of Glasgow, 2023. Hedgehog Friendly Campus. [Online] Available at: https://www.gla.ac.uk/myglasgow/sustainability/biodiversity/hedgehogs/#:~:text=The%20University%20of%20Glasgow%20is,environments%20to%20the%20Eurasian%20hedgehog. [Accessed 26 October 2023].

University of Glasgow, 2023. Our Commitment to the United Nations' Sustainable Development Goals, Glasgow: University of Glasgow.

University of St Andrews Annual Sustainability Report 2020/2021. The University of St Andrews, pp. 1–22. Available at: https://www.st-andrews.ac.uk/assets/university/sustainability/documents/sustainability-development-report-2020-2021.pdf.

University of St Andrews Annual Sustainability Report 2021/2022 (no date). The University of St Andrews, pp. 1–21. Available at: https://www.st-andrews.ac.uk/assets/university/sustainability/documents/sustainability-development-report-2020-2021.pdf.

University of St Andrews, 2023. Biodiversity. [Online] Available at: https://www.st-andrews.ac.uk/sustainability/biodiversity/ [Accessed 27 October 2023].

University of St Andrews, 2023. Environmental Sustainability Strategy, St Andrews: University of St Andrews.

University of St Andrews, 2023. Net Zero by 2035. [Online] Available at: https://www.st-andrews.ac.uk/sustainability/ [Accessed 27 October 2023].

University of St Andrews, 2023. The St Andrews Forest. [Online] Available at: https://forest.st-andrews.ac.uk/ [Accessed 27 October 2023].

University of St Andrews (2023). Vision and Strategy - Sustainability - University of St Andrews. [online] University of St Andrews. Available at: https://www.st-andrews.ac.uk/sustainability/vision/.

Waghorn, T. (2012). John Robinson: Universities as Societal test-beds for Sustainability. [online] Forbes. Available at: https://www.forbes.com/sites/terrywaghorn/2012/07/03/john-robinson-

universities-as-societal-test-beds-for-sustainability/?sh=4765b41078a8. [Accessed 8 Nov. 2023].

Waste Management Strategy and Action Plan (2022). University of Glasgow. Available at: https://www.gla.ac.uk/media/Media_999224_smxx.pdf.

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