Dear Future, Greener Place…

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Why Does It Matter?

Climate change is a multi-layered earth system phenomenon measurable in a variety of natural and environmental settings: polar ice sheets, marine ecosystems, boreal forests, atmospheric greenhouse gas concentrations. We tend to associate it most commonly with marked changes in the weather and particularly in extreme meteorological events, from superstorms to droughts and heatwaves, which are increasing in frequency and intensity across the globe.

But climate change is more than a scientific issue. It is also an inherently *social* process. Its causes are inherently human, from the way we have chosen to organise our way of life these past hundred years or so, by creating high-carbon societies dependent on fossil fuels and their myriad derivatives to the way we have encroached upon the natural environment and its diverse resources to maintain that particular way of life. We have lived a non-renewable culture, one that was always going to reach the end of the line.

It is widely accepted that human activity precipitated global warming and as a result changed the planetary climate system. Experts agree that if we do not immediately mobilise to prevent an increase in the earth's temperature beyond 1.5C degrees from pre-industrial levels, significant, irreversible damage will occur across multiple environments and ecosystems, scalar changes that will have cascading effects across all regions and societies on earth.[1]

These will impact at local and planetary levels: from our secure habitats and species biodiversity to our mental and physical health, from the buildings we live in to the clothes we wear, the food we eat and the air we breathe.

Climate change will transform our political, economic and financial systems, our transport, energy and agricultural infrastructures. It will change employment, from the way we work to the kinds of jobs we have. Our leisure and consumption patterns will all be subject to a range of changes that will become more drastic and severe depending on the scale and rate of the temperature increase and its related feedbacks.

The solutions to the problems we now face in climate breakdown depend on our ability to realise the scale of this challenge and make the necessary

societal changes and adaptations to confront and mitigate it. Many people are already experiencing adverse effects of climate change around the world. In other places, however, there remains a discernibly false sense of complacency that 'it will not be as bad here'. This is wishful thinking. No matter where we come from, climate change *will* produce changes and present formidable challenges in many aspects of all our lives in the coming decades. The time to react, act and adapt to mitigate these threats is now. And it is important to emphasise that this is not all about loss and grief for the world we made. If we transition in the right way, one that is just and spread wide, we can create real gains from the social and technical transformation to low-carbon society.[2]

How VIDI Helps

A fundamental challenge of climate change for many is its imperceptibility. As a time-deferred, predictive process, its incremental or haphazard nature can often make it seem impalpable to many citizens, slowing their sense of urgency and willingness to act and make the necessary changes.

The role of Vidi will be to render the future with climate change in the now, to provide an immersive climate imaginary that allows its users to envision and contemplate the possible feel and form of the altered worlds to come – good and bad. Cities through history have always required and been subject to processes of reimagining, and confronting climate's possible reshaping of our world is the ultimate test of that. Our urban environment will be different – visually, spatially, sensorially, organisationally. In both a positive and negative scenario, climate changed Glasgow will look, smell and *feel* different.

Immersive technology provides a means to stimulate a speculative sense of the consequences. It can give us some agency and sentience of the world we can create given a positive transition but also the world we can degrade with a lack of proportionate measures. This is a playful but also a provocative climate imaginary; giving us the opportunity to engage with possible futures in order to build consensus and react in the present.

Glasgow Futures

The changing climate will register differently in the world's distinctive climatic zones and the uneven impacts and outcomes will prove a significant feature of life in cities and regions across the globe.

Glasgow will experience temperature rises and likely suffer the consequences of extreme weather events. These will threaten the resilience of the city's physical and social infrastructure and place added pressure on the health of its citizens.[3] Like most cities, it will also be subject to various impacts from international turbulence borne from climatic shifts. The extent of this will depend on the actions we take and the time taken to make them effective.

Unchecked, intensified warming beyond 2C degrees will increase propensity for flash flooding, induce local biodiversity loss, sea level rise and ocean warming, increase wild fires and erode soils.

These will all present a range of negative outcomes, from forced migration of displaced people, degraded housing stock and real estate crises to unpredictable forms of economic shock, debilitated food production and multiple distribution and supply shortages. Consequent health and utility challenges, depleted air quality, financial system disruption and multiple related social instabilities will likely aggravate already existent inequalities. This is why the city council declared a climate and ecological emergency in May 2019.[4]

On the other hand, if we meet our net zero targets we have every chance of improving life and habitat in and around the city, reducing pollution and creating a range of health and wellbeing benefits.[5] Creating a new green infrastructure will mean many new 'net zero' jobs, regenerating local agro-ecologies, safer and more resilient neighbourhoods and a rebalancing of the everyday economy, with a wide range of other positive opportunities and changes.

Glasgow's Clydeside

Clydeside presents a focal symbol of the historical transformations and redevelopment of Glasgow through time. Its iconic qualities resonate nationwide; a readily identifiable site able to generate the kinds of inspiration publics in Scotland and around the world require to make their own transitions. Its surrounding landscape is frequently reproduced in aerial or landscape images, producing effective means to seamlessly envision its dramatic renovation into a climate ready space.

The river itself will literally contribute to the divergent outcomes of action and inaction on climate change. It can be used as a heat source, a water transport hub, a site for new district energy plants and other green industrial and agricultural developments.[6] The adjacent brownfield sites and open spaces between various buildings are adaptable into sustainable habitats and climate ready architecture.

In this positive vision, recognisable buildings literally become green with emplanted facades. The rapid urban afforestation programme[7] intersects with the development of the new wheeler highways as people cycle for health, leisure and commuting. It is a shining example of a city that determined to transition the right way.

The river, however, is equally significant as an imagined source and site of negative impacts, most specifically from sea level rise and extensive flood damaging events[8]. This vision utterly changes the look and feel of water-lapped

buildings around it, emptying Clydeside of people and activity, with immediate transport and communications infrastructure destroyed, businesses defunct. Waterlogged Clydeside in this view is a symbol of abandonment, inaction and failure, of a city overcome by ecosystem degradation and its attendant social harms.

Glasgow's George Square

As the administrative and geographic core of the city, with high footfall, George Square is one of the most palpable spaces for Glasgow's citizens and visitors to connect to the consequences of action and inaction on climate. In a climate ready scenario, the look and feel of the ultra-low emission square is dramatically transformed to the eyes and ears.

A climate ready scenario depicts a fully pedestrianised space offering a rolling vista of adaptation: the vertical gardens of the restaurants and hotels are immediately eye-catching; rivalled by the solar-panelled façade of Queen St Station. The Square is now host to many more small businesses and enterprising projects associated with the transition, bike hubs and 'remake and repair' services, as well as a portfolio of cultural events and leisure activities that take place in between its newly afforested areas and the City Allotment site.

A climate *un*ready scene is wholly different: protesters often converge on the City chambers on a range of issues from housing to energy costs to job losses. A battery of air conditioning units ceaselessly thrum around the square. Traffic throngs the site, which itself is subject to flash flooding. Businesses vacate, citing the economic costs and building denigration, as footfall has dramatically decreased in a space where the urban heat island effect is most intense and air quality is highly degraded[9].

These are, of course, deliberately provocative scenarios, but Vidi allows us to entertain their credibility. In doing so it functions as an inspiring and effective tool for citizens in cities and affected spaces all across the world, in their attempts to realise, transform and prevent negative impacts, and ultimately keep the planet below that 1.5 degree threshold. If we manage that, trees will continue to grow, birds to fly, fish to swim – and bells will most definitely ring.

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[1] The most recent IPCC report, *Climate Change 2021: the Physical Science Basis*, published in August 2021 from Working Group 1 emphasises that "climate change is rapid, widespread and intensifying," and finds that "unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach."

[2] The draft Glasgow Green Deal roadmap, outlined on 21st October 2021 ten days prior to the city hosting the crucial UNFCCC Cop26 talks, claimed that "it is projected to create over 14,500 extra jobs, as well as increasing inward investment, improving business competitiveness, ensuring a more fair and equal economy." Glasgow City Council, "Glasgow launches nine-year mission to transform its economy to tackle the climate emergency." https://www.glasgow.gov.uk/index.aspx?articleid=27632

[3] The 2018 report by Climate Ready Clyde, "Towards a Climate Ready Clyde: Climate Risks and Opportunities for Glasgow City Region" notes (p.3) that annual economic cost of climate change in Glasgow City Region is estimated to be £400 million each year by the 2050s; around 1% of current GVA. In many cases these impacts will fall on disadvantaged and vulnerable groups." However, it also emphasises the economic benefits of the process of large scale adaptation to new green infrastructure. https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e78f471c10b1f023cad45/1550743810668/01+L575+CRC+Key+Findings.pdf

[4] Glasgow City Council, "Glasgow's Climate Plan." Published 28th June 2021. https://www.glasgow.gov.uk/councillorsandcommittees/viewDoc.asp?c=P62AFQDNDXUTT181NT The plan (p.8) also notes the total number of houses and businesses in danger of being flooded rises to almost 60,000 by 2080.

[5] The UK Climate Change Committee noted in its 2019 "Reducing Emissions in Scotland – 2019 Progress Report to Parliament" that Scotland's net-zero by 2045 GhG emissions target represented a "step-change in ambition for Scotland" and that though significant reduction have been met, the real task lies ahead: "The Scottish Parliament's 2030 target to reduce emissions by 75% will be extremely challenging to meet. It must be backed up by steps to drive meaningful emissions reductions, immediately." https://www.theccc.org.uk/publication/reducing-emissions-in-scotland-2019-progress-report-to-parliament/

[6] The UK's first modular district heating system from an industrial water source heat pump was opened on October 8th, 2021, downriver at Queen's Quay, providing low carbon high temperature energy for surrounding houses and businesses. This is a delivered example of the benefits of switching to green energy systems. https://www.west-dunbarton.gov.uk/council/newsroom/news/2021/oct/water-from-clyde-used-to-heat-homes-in-new-clydebank-energy-system/

[7] The Glasgow Council Climate Plan details how the strategic tree planting project aims to plant at least 22,000 trees ("around 14.ha, equivalent to 21 full size football pitches.") Upscaled installation of solar voltaics, LED lighting and refits to building management systems aims to reduce emissions "by approximately 27,000 tC02 – which will see the city's footprint reduced by 55% compared to its 2005/06 baseline." (p.12)

[8] The 2018 report by Climate Ready Clyde, "Towards a Climate Ready Clyde: Climate Risks and Opportunities for Glasgow City Region" notes (p.3) that "the assessment of the marine and coastal environment estimated that under a high emissions scenario the risk of coastal flooding will increase as sea levels in the Firth of Clyde rise by a projected 0.47m by the 2080s. A large amount of the transport network, from road, rail and aviation will be subject to flooding threats.

[9] Climate Ready Clyde's 2021 report "Glasgow City Region Climate Adaptation Strategy and Action Plan" notes that Glasgow's maximum summer temperatures will rise by at least 1.1C by 2030 and by 2.6C by 2080. This means that "in the future, the concentration of urban development is likely to be affected by rising temperatures and heatwaves." (p.61)