THE IRISH ACADEMY OF
ENGINEERING
ENGINEERING & TECHNOLOGY

THOUGHT LEADERSHIP IN A TIME OF GREAT CHANGE

Coronavirus
COVID-19

Lessons from the Covid-19 Experience – Building a Green Future Together

THE IRISH ACADEMY
OF ENGINEERING

JUNE 2020

Preamble – The Irish Academy of Engineering

The Irish Academy of Engineering was founded in 1997 by a group of experienced members of the engineering profession. It is an all-Ireland body and a registered charity.

The Academy is concerned with long-term, strategic issues where the engineering and related professions can make a unique contribution to economic and social development.

The mission of the Academy is to employ the particular knowledge and experience of its members or Fellows to inform public debate and to provide unbiased and independent, evidence-based advice to Government and wider society on issues where technology plays a key or central role.

Its members are Irish engineers of distinction, men and women drawn from a wide range of disciplines and from all parts of the island. Membership currently stands at approximately 160. All play, or have played, leading roles in society and the profession and give of their time and expertise on a *pro bono* basis in the public interest.

The Academy is funded through the subscriptions of the Fellows and philanthropic gifts.

The Academy forms part of the Universe of Engineering which is best exemplified by the fact that Labour Market Surveys have shown that engineers account for at least 5% of employment in every major sector of the economy.

The Irish Academy of Engineering is affiliated with other engineering academies in Europe through membership of the umbrella group Euro-CASE.

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1 Preface by the President of the Irish Academy of Engineering

The emergence of the Covid–19 virus has challenged us in a very fundamental way. The speed with which it spread around the world and the realisation that there is no immediate 'magic bullet' to deal with it serves to remind us of that our advanced technological society cannot always provide an immediate answer. We hope, indeed expect, that an effective vaccine will be developed quickly but, in the meantime, we are left to our own resources.

There will be, no doubt, many important lessons to be learned from the ongoing Covid-19 experience. An important one is however already evident. The great majority of citizens, in Ireland and worldwide responded remarkably well to the challenge posed. People showed an impressive capacity to respond positively and to readily accept very severe restrictions on their daily lives in a stoical and disciplined manner. It reminds us that when people are convinced that their sacrifices are necessary and worthwhile they are willing to 'put their lives on hold' for the greater good. The urgency of the Covid-19 problem was clear and people believed that they had the agency or the means to contribute to its solution.

The key to this popular response was evidence-based leadership, transparency and regular, honest communication of the situation to be faced.

One can readily conclude that if people are well served by their leadership then they are prepared to take coordinated and shared action over time, however disruptive of their individual and family lives, to deal with an urgent societal challenge.

This augurs well for the suite of major challenges that will still be facing the world once the coronavirus crisis passes. These are the inter-linked issues of decarbonisation, resource depletion, loss of biodiversity and climate change. We will need all the lessons that can be learned from the Covid-19 experience in guiding us in how we might best deal with these existential challenges.

Up to now the warnings and the evidence have largely been ignored or downplayed. After all, it might be said, climate change is a relatively slow process lacking in urgency. Allied to that is a "lack of agency" - what can we as individual citizens or indeed as a small island do about this big intractable, international problem?

Climate change may lack the immediacy of Covid–19, but it is relentless. Unlike Covid-19 there is absolutely no possibility of a vaccine "magic bullet" to resolve it. It is an issue that requires concerted, shared action over an extended time period.

Our response to Covid–19 over the past several months shows that in the right circumstances humans have the capacity to take such common action.

With such thoughts in mind, the Irish Academy of Engineering calls on the authorities in the Republic of Ireland and Northern Ireland to prioritise decarbonisation and circular economy measures in the post-lockdown relaunch of the economy.

We further urge the authorities in both jurisdictions on the island of Ireland, to harness the positive public responses to the challenge of Covid–19 by creating a grand, society-wide consensus on how to confront climate change and the challenge of developing a sustainable economy.

We believe that a shared and clearly articulated way forward which is appropriately informed by the evidence is absolutely essential if we are to effectively address the challenge of climate change. Building a "green", clean economically viable future is a daunting challenge. It will require major changes in virtually all aspects of our lives. It will only be achieved with long term, sustained action.

The Irish Academy of Engineering is committed to support a Government led initiative to develop such a consensus. We believe a re-launch of the successful 'Citizens' Assembly' approach is key to achieving this goal.

There are serious short-term difficulties to overcome before a return to anything like "normal" life can re-start. Much depends on the healthcare situation and the social distancing rules to be observed. There is little doubt that the major challenge facing the political leadership on the island over the coming months is the re-launch of an economy that is likely to be scarred by the essential restrictions inspired by the crisis.

Once this task has been successfully navigated the real task of re-building the economy can begin in earnest.

I would like to echo the comments of former Irish President Mary Robinson who recently noted "Governments need to put huge amounts of money into trying to sustain jobs and livelihoods...but they must do it with a very strong green emphasis. The threat from climate change is as real as the threat from Covid-19, though it seems far away."
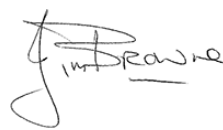
The Academy also welcomes the Programme for Government issued on 15th June 2020 and is pleased to acknowledge the many positive proposals it contains. Indeed, the Programme's proposals with regard to "the ongoing climate and biodiversity emergency" are very much in the spirit of the recommendations made in this document.

Just as the Programme for Government addresses a broad spectrum of issues so the Academy's various committees and work groups over the past lockdown weeks have been examining the implications of the Covid crisis for a range of different sectors of our society and economy from enterprise to energy and innovation to infrastructure.

Each of these groupings intends to publish interim findings as they proceed and these sectoral studies should become available during the summer. Our intention is to ensure that this material receives the widest possible circulation as we seek to achieve our objectives of both influencing and informing the debate on the great challenges of our time. We also hope, as the incoming Government gets to grips with the many grave issues it faces and starts to add detail to the broad objectives in the Programme for Government, that these papers will prove an invaluable resource.

The present document seeks to set out the overall context within which both this further work and the re-building of the economy will take place – the post-Covid world. It addresses not only some of the key technical and technological elements but also explores how these interact with social, political and economic forces. It is early days as yet in envisaging the post-Covid word and as the Programme for Government notes "the task is immense". But it is not a moment too soon to start to tackle the decarbonisation of our economy and the building a shared, green future – together.

I commend this paper to you.

Dr. Jim Browne
June 2020

2 Executive Summary

The Covid-19 viral pandemic has seriously disrupted the social and economic order and the daily lives of people across the globe. Its impact has been as seismic as it has been unforeseen. Millions of people have been infected by this strange, erratic, and novel disease. While many have had mild or no symptoms others have been severely affected and hundreds of thousands more have died – a toll dominated by some of the most vulnerable members of society: the elderly, the frail and the immune-compromised.

In a matter of a few weeks people's lives have been completely upturned. The consumer economy across most of the globe has ground to a virtual halt, businesses have been shuttered, unemployment has rocketed, people have been confined to their homes and fiscal and monetary discipline has been abandoned. All of this as part of a frantic effort by governments to arrest or slow the spread of the virus.

The State's role has, suddenly and of necessity, become significantly more intrusive in the everyday lives of citizens. What in normal times would be considered unacceptable has become in effect a new, if possibly transient, 'normal'.

The Academy is aware that it is not yet possible to grasp the full extent of the complex and interacting nature of the problems created by the virus. Representing, as it does, some of the most experienced people Ireland has to offer in the fields of technology and engineering, it is hoped that the observations and commentary presented in this document will prove beneficial to those facing the forbidding task of guiding and leading us over the coming years back to the stability of some form of new or "next" normal.

Short-term consequences abound – based in the main on measures designed to constrain the spread of infection. Social distancing requirements have led to the closure of most workplaces including offices, schools and building sites. Working from home has forced an increased reliance on technology for everything from education and communication to purchasing retail goods. Traffic on the roads and in the air all but ceased for a period of over two months.

Looking beyond these immediate consequences to divine longer-term impacts is inevitably fraught with the usual risks associated with crystal ball gazing – one's predictions are almost certain to be wrong. Nevertheless, there is intriguing evidence, based on various threads or trends, about how things may eventually develop.

The relative helplessness of the individual and fragility of the everyday world we all take for granted and the need for a prolonged communal approach in the face of the Covid-19 threat will certainly have graphically underlined the reality that 'no man is an island'. Every individual's effort and commitment is needed if disaster is to be averted. Important lessons in the power of social cohesion and community solidarity are being learned – or re-learned – that evoke, for some, the old rural Irish tradition of the *"meitheal"* (co-operative working and community solidarity).

The *"meitheal"* mindset could be of profound significance and advantage in addressing the equally daunting challenge of averting and adapting to climate change – a problem that hasn't gone away and will still be demanding resolution when the pandemic crisis has eased. While the parallels between the Covid crisis and the effects of global climate change are not exact they are proximate. As Barry Commoner, the pioneering environmentalist observed, "the first Law of Ecology" is that "Everything is Connected with Everything Else".

During the lockdown period, Irish cities saw dramatic falls in traffic while pollution from cars dropped by 50% as a consequence. These improvements in air quality and the lack of a need to commute were widely welcomed. This has led to speculation about the likelihood of a more permanent adoption of a "working-from-home" culture – at least on a part-time basis. There is evidence that demand for office accommodation will likely fall in the aftermath of the crisis as employers digest lessons from the period of the lockdown.

This significant change has encouraged rhetorical discussion as to what will or should the post-Covid crisis world look like? Will the Covid-19 crisis and the reaction to it become stimuli for change? If so, what kind of change? These are tantalising thoughts albeit soon after the disruption and distress of the pandemic – while also acknowledging that the virus will very likely be with us for some time.

Huge societal change has arisen out of climactic events such as previous epidemics and wars. Some authors contend that they changed history such as the aftermath of the Plague of Athens in 430 BC or the Black Death in the 14th century. More recently, the experience of the Second World War provoked a seismic change in the politics of the United Kingdom in the summer of 1945 when a war-weary British public abandoned the Churchill –led Conservatives and embraced the radical, reforming policies of the Labour Party led by Clement Attlee. He promised a prosperous and egalitarian "new Jerusalem" that resonated with the public.

Might there be elements of such tectonic changes evident in the present mood? Is there an appetite to build a modern version of Attlee's 'New Jerusalem' – prosperous, egalitarian but also environmentally sustainable and biodiverse? Or, as characterised by the language of the EU in its recent publication 'A Circular Economy Action Plan': "a climate-neutral, resource-efficient and competitive economy".

Such a view is not fanciful. Recent polling by Friends of the Earth found that "seven in 10 Irish citizens feel 'very strongly' that a failure to act on climate change is a failure to act in the best interests of the people of Ireland. Only 23% of respondents either 'disagree strongly' or 'disagree somewhat'. In addition, some 90% of respondents believe Irish climate-change policies should be guided by science rather than politics – as was the case with Covid-19. 67% of all respondents polled believed it was important that "government actions prioritise climate chage in the economic recovery after Covid-19". There was a clear majority in favour of this proposal across all age groups and regions.

There are indeed compelling reasons for government to pursue a radical, environmentally focussed agenda. Climate change is one already and it is without doubt the central issue of our time. Biodiversity loss is another. Both issues are inter-linked, and both represent an existential threat to the future of mankind.

It is widely recognised that such is Man's influence on all aspects of the natural environment that it has been suggested this era should be called the Anthropocene. With a continually growing population and a relentless quest for land and raw materials mankind is encroaching on ever more remote areas of wilderness and environments hitherto the exclusive domain of animals. The results are ecological degradation and loss of biodiversity "at a rate unprecedented in human history" – as expressed by Minister Josepha Madigan in the Dáil in 2019.

Policies and practices are urgently required that enhance the respect shown for the natural world and the reservoir of plants and animals that share the planet. This would be a sensible recognition of the risks we run by ignoring the welfare of the natural world.

Research confirms that the continuing decline in a broad range of species and the degradation of natural environments represents a serious threat to human wellbeing on a number of fronts. In this context it is thought the risk of viral transfer to humans of zoonotic diseases is increasing and will remain high.

The EU Presidency has issued a call to the European Commission to develop "without any delay an ambitious, realistic and coherent 2030 EU Biodiversity Strategy as a central element of the European Green Deal. The European Green Deal and digital transformation are part of the EU recovery strategy agreed between President von der Leyen and President Michel on 22 April 2020. The Green Deal will encompass enabling initiatives addressing industrial strategy, financing mechanisms, the circular economy and just transition.

The International Labour Organisation in a 2015 publication set down guidelines for a "just transition towards environmentally sustainable economies for all". Many governments in the interim, including Ireland and Scotland, have applied these.

In Ireland, the Climate Change Advisory Council has noted "the success of participatory approaches to engagement, for example the Citizens' Assembly". The Academy shares the view of the Council that this approach helps "to facilitate engagement and ultimately strong stakeholder ownership of mitigation policies, which….help to achieve a just transition".

Conclusions

1. The Covid-19 pandemic has wrought unprecedented disruption in the social and economic life of many countries across the globe. In Ireland there has been wholesale closure of businesses, the possibly permanent loss of hundreds of thousands of jobs and a huge increase in national indebtedness.

2. This disruption has been accompanied by an equally unprecedented level of State involvement and control in all aspects of the citizen's life – with their general acquiescence in the interests of the public good.

3. The disruption has necessitated the deployment of massive sums of emergency State funding, to maintain whole sectors of the economy on 'life support'.

4. Further additional expenditure on a huge scale is anticipated to reboot and revive the economy when the acute phase of the crisis eases sufficiently.

5. All or most of this additional State expenditure will have to be borrowed – from European institutions or other international funds. There may be a modest element of grant aid from these sources.

6. Borrowing of substantial sums may be sustainable if interest rates are low and the repayment period is exceptionally long.

7. On balance, although the shock to the economic life of the country has been an unusually sharp one, recovery may also be surprisingly rapid.

8. Thus, a 'once-in-a-lifetime' social and economic upheaval is upon us. The question is then: "can the crisis be put to good use?" Can society be democratically re-modelled by employing the community solidarity that the crisis has engendered, so that it is put on a more environmentally sustainable path?

9. Major structural changes are needed to achieve such an outcome. In normal times this would be politically difficult if not impossible to achieve. The immediate post-Covid period may provide a window of opportunity unlikely to be repeated when the necessary changes may be initiated.

10. The change to a more sustainable economy must be achieved in a manner that is respectful of Just Transition principles.

11. The implications of the crisis and its aftermath for specific sectors of the economy will be assessed by the Academy in a series of briefing papers being prepared and to be issued in the coming weeks. The areas being assessed will include many of those targeted for support in the EU's Green Deal and include:
    - Infrastructure
    - Renewable Energy
    - the Circular Economy
    - Cleaner Transport
    - Digital connectivity.

Recommendations

The Academy makes the following recommendations to government:

1. The Academy recommends that public policy should be fully aligned with any trend away from exclusive reliance on the static office working environment and provide whatever supports are needed to encourage and reinforce the emergent "no commute" culture. This will have implications across a range of areas including land use planning, balanced regional development, home design, public transport, personal taxation, and access to broadband.

2. Government, in imagining and developing policies to deal with the immediate aftermath of the crisis and the rejuvenation of the economy, should ensure such policies can also promote a "greener" future.

3. Ireland, as part of its embrace of sustainability, should support the renewed and strengthened EU Biodiversity Strategy as part of the Green Deal and ensure its implementation in Ireland.

4. The ambitious agenda of the circular economy and the associated technological revolution should be promoted as part of a progressive and successful greening of the economy in both jurisdictions on the island.

5. Ireland should be clear and strong in its support for the EU Green Deal and oppose any attempt at EU level to abandon or unwind hard won progress in other areas of the environmental agenda, including the Emissions Trading System.

6. The most practical way to build consensus, avoid undesirable social and economic outcomes and achieve the goal of a sustainable, decarbonised economy is by re-tasking the Citizen's Assembly with proposing the most equitable way of transitioning to a decarbonised, sustainable economy with key milestones in 2030, 2040 and 2050.

7. Economic recovery programmes should be designed to achieve the key, longer-term, strategic environmental objective of a decarbonised, circular economy.

3 Introduction

The **Covid-19** viral pandemic from its origins in China in late 2019 has seriously disrupted the social and economic order as well as the daily lives of people across the globe. Its impact has been as seismic as it has been unforeseen. Millions of people have been infected by this strange, erratic, and novel disease. While many have had mild or no symptoms still others have been severely affected and hundreds of thousands more have died – a toll tragically dominated by some of the most vulnerable members of society: the aged, the frail and the immune-compromised.

In a matter of a few short weeks people's lives have been upturned as the consumer economy has ground to a virtual halt. Businesses have also been shuttered, unemployment has rocketed, and people have been confined to their homes while fiscal and monetary discipline has been abandoned. All of this as part of a frantic effort by governments to arrest or slow the spread of the virus.

In the view of the consultancy **McKinsey**, "The coronavirus is not only a health crisis of immense proportion—it's also an imminent restructuring of the global economic order...".[1]

The State's role has, suddenly and of necessity, become significantly more intrusive in the everyday lives of citizens. What in normal times would be considered unacceptable in a liberal democracy has become in effect a new, if possibly transient, 'normal'.

In Ireland, as elsewhere, budget deficits will be unprecedentedly large as the government rushes to prevent the economic system from going into catastrophic freefall. In its second Quarterly Bulletin of 2020 the **Central Bank of Ireland** estimated Irish GDP could decline by 8.3% in 2020 with an unemployment rate of 25% in the second quarter of the year. The Bank noted, "due to the nature of the pandemic it is not possible to produce a conventional forecast on the outlook for the Irish economy".[2]

All of this is occurring at a time when the impact of **Brexit** - until recently the single most threatening external factor facing the island's economy - remains highly uncertain.

National budgets will need to be rebalanced, somehow, over time. The impact of greatly loosened monetary policy on future interest rates, bond prices and stock prices is unknown.

The Irish State is in the fortunate position of being able to borrow almost unlimited funds at present at low or even negative interest rates.

It is possible inflation will help to moderate the longer term burden of the resulting debt, although it may be noted this did not happen after the substantial 'quantitative easing' practised by central banks in the period after the 2008-09 crisis.

There can be little doubt that the virus will in time be overcome. Teams of scientists and medical researchers worldwide are actively researching a vaccine and treatments. Once these are available – perhaps later in 2020 or more likely in 2021 - people should be able, in theory, to resume their normal lives, or seek to construct new ones, without the ongoing fear of catching a potentially fatal or life-changing illness.

What is not clear are how much people's attitudes and perspective on life will have changed because of the shared experience of a prolonged period of living with the threat of Covid-19. Commentators speculate that conventional attitudes to a whole range of issues, such as the nature of our society and the respective roles of government, the public service, business and industry are being placed under severe stress and may undergo significant and profound, even radical, change.

The Academy is aware that it is not yet possible to grasp the full extent of the complex and interacting nature of the problems created by the virus. Representing, as it does, some of the most experienced people Ireland has to offer in the fields of technology and engineering it is hoped that the observations and commentary presented in this document will prove beneficial to those facing the forbidding task of guiding and leading us over the coming years back to the stability of some form of new or "next" normal.

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1   "Beyond Coronavirus: The path to the next normal". McKinsey and Co., March 2020
2   https://www.centralbank.ie/publication/quarterly-bulletins/quarterly-bulletin-q2-2020

4 The Emerging Normal

As a journalist noted recently "while a month may be a long time in politics a week is an aeon during the coronavirus crisis". A lot has indeed happened over the past few months and accelerated change seems likely to remain an ongoing feature of the crisis.

Some of the developments noted over the past few weeks make the point well.

People, newly working from home, have had to improvise overnight to maintain contact. As a result, there has been a rapid and widespread adoption of video-conferencing technology. People and organisations found they were surprisingly comfortable with technology-enabled meetings – even the Supreme Court had its first ever video-enabled remote sitting on 20th April. The Chief Justice said he suspected it would be the first of many such remote hearings in the future.

The trend is reflected in the Nasdaq price of stock in the videoconferencing specialist Zoom, which doubled over a two-month period to the end of April. This was at a time when most other shares had fallen dramatically in value.[3] Zoom is joined by Google Hangouts, Skype, UberConference, Microsoft Teams and many others.

This rapidly ascended learning curve and the positive nature of the experience of home working gained by many during the crisis seems certain to influence future working and travel patterns. It may lead to a permanent adoption of this option even when the possibility of a return to the normal commute is available. This in turn could impact the demand, or a lack of it, for meeting facilities, hotel accommodation and even office accommodation with implications for planning land use in and around our cities.

In a prescient newspaper article at the end of 2019 tech-guru Chris Horn suggested that Ireland should "exploit our leadership in hosting cloud computing to switch our economy away from urban concentration instead to minimal or even no-commute, and to work from or close to home".[4]

The virus has forced the pace of such a change in a way that could not have been foreseen even 6 or 7 months ago, underlining the likely role of the crisis as an accelerant as much as a disruptor of trends.

As Horn noted, the adoption of home-working by a significant number of erstwhile commuters

would have an immediate and beneficial impact on current traffic problems by reducing pressure on both the road network and public transport systems.

Other benefits could accrue, as Horn again noted "Rather than the carbon emissions of literally hundreds of thousands of commuters; rather than the intense pressure on urban planning, housing and on personal lifestyle; and rather than investing heavily in yet further major infrastructure arteries, should we not now rapidly foster a national culture of no-commute whenever possible? The improvement in our national quality of life would be truly transformative, and benefit across all our society".

Video-conferencing technology is being adopted in the healthcare world in the same accelerated manner as in other sectors. This will inevitably impact on medical work practices with a range of potential beneficial impacts, including easier and more efficient access to GPs and reduced hospital waiting lists.

Educational establishments have also had to adapt to the new realities imposed by social distancing and lockdown. Irish universities earn some €385 million in fees from overseas students annually. This revenue is now threatened by the inability to travel and related disruption. *The Guardian* reported recently that UK universities stand to lose tuition fee revenue of £2.5 billion next year with up to 30,000 academic jobs lost as a direct consequence of the pandemic.[5]

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3   Though in another sign of the times the Guardian reported on 24th April that the UK security services have warned the British government not to use Zoom for confidential business as they believe it is "vulnerable to Chinese surveillance".

4   "Chris Horn: We need to adopt a no commute culture", Irish Times, 12th December 2019.

5   "Manchester University braced for losses of more than £270m", The Guardian, Sat 25th April 2020.

There may be worse to come. Higher education leaders in the U.S. are already speaking of the 'destigmatisation' of on-line education. This trend clearly presents not only a challenge to traditional providers but also a serious threat to their business model.

The retail sector has been badly affected by the measures introduced to suppress the spread of the coronavirus. These measures, primarily the closure of shops and the restrictions on movements, have had immediate and severe consequences for some well-known High Street names including Debenhams, Oasis and Warehouse. All of which have gone into liquidation during the crisis.

There are beneficiaries too – including on-line shopping outlets, home delivery retailers and couriers.

It is evident that the crisis has placed globalisation under renewed scrutiny. First, the hyper-inter-connectedness of the world economy facilitated the spread of the virus from its origins in Hubei Province in China in late 2019. Secondly, the fragility of supply chains dependent on "off-shore" manufacturers came into particular and acute focus in relation to seemingly modest but critical items of personal protective equipment or PPE used by healthcare workers. The demand for such items soared in Europe and the US just as the main source of their production – China – was least able to supply them to an increasingly desperate West.

This desperation was well captured by Governor Andrew Cuomo of New York State in one of his daily news conferences in April when he held up a small facemask and a plastic gown of the type so badly needed by the healthcare system. At the time, he asked incredulously why there were no local New York or even American manufacturers of such simple items. He even promised to help support manufacturers to convert their processes if necessary.

Manufacturers reliant on overseas suppliers will have become acutely aware of their exposure to "lean", "just-in-time" intercontinental supply chains where minimal levels of inventory are maintained. It has been reported that some major manufacturers, because of the complexity and opaqueness of modern supply chains, were unaware of their exposure – or at any rate the scale of that exposure. This model became redundant almost overnight due to the virus and will no doubt be replaced by one that places a much greater emphasis on resilience and responsiveness.

Supply chains will undergo extensive mapping and de-risking to ensure unrestricted access to inventories - possibly using multiple and redundant routes. This will likely lead to the "reshoring" or repatriation of some activities to the U.S. and Europe that are currently undertaken in China. Whether this is the right response is open to debate and probably depends on the industry. Any such changes will as yet unknown consequences for the economies of all three of the world's great economic pillars.

Governor Cuomo appeals for local manufacture of PPE

5 Exploring Possible Longer-Term Consequences

Looking beyond the immediate consequences of the crisis to divine longer-term impacts is inevitably fraught with the usual risks associated with crystal ball gazing – one's predictions are almost certain to be wrong. Nevertheless, there is intriguing evidence, based on various threads or trends, of how things may eventually develop.

The relative helplessness of the individual and fragility of the everyday world we all take for granted, and the need for a prolonged communal approach in the face of the Covid-19 threat, will certainly have graphically underlined the reality that, as the poet John Donne observed, 'no man is an island'. Every individual's effort and commitment is needed if disaster is to be averted. Important lessons in the power of social cohesion and community solidarity are being learned – or re-learned – that evoke, for some, the old rural Irish tradition of the *"meitheal"* (essentially co-operative working and community solidarity).

This chimes with the ground-breaking research of the Nobel laureate economist and political scientist Elinor Ostrom, who showed that in real life situations, and contrary to the assumptions of classical economic theory, people readily cooperate and are willing to endure sacrifice for the collective good.[6]

The *"meitheal"* mindset could be of profound significance and advantage in addressing the daunting challenge of averting and adapting to climate change – a problem that hasn't gone away, notwithstanding the virus, and will still be demanding resolution when the pandemic crisis has eased.

In spite of the stresses and worries induced by the crisis and its aftermath many have noted and appreciated the cleaner air and audible birdsong that have also been a feature during the lockdown. Globally, there are reports of fish returning to the canals of Venice and greatly improved air quality in normally smog-ridden cities like Delhi and Beijing.

Such benefits are worth having and worth striving for. They are easily overlooked or under-valued under normal circumstances.

The Helsinki-based research body the Centre for Research on Energy and Clean Air (CREA) calculated that "the measures to combat the coronavirus have led to an approximately 40% reduction in average level of nitrogen dioxide (NO2) pollution and 10% reduction in average level of particulate matter pollution over the past 30 days [of April], resulting in 11,000 avoided deaths from air pollution (95% confidence interval: 7,000 - 21,000)." CREA estimates that the number of avoided deaths in Ireland during this period is 18-35.[7]

CREA's map of Western Europe shows the extent of NO2 pollution on 16 March 2019 (right) and exactly one year later during the lockdown period (left). The contrast is self-evident.
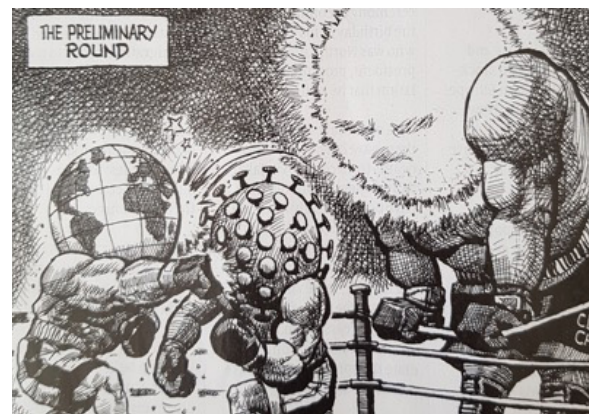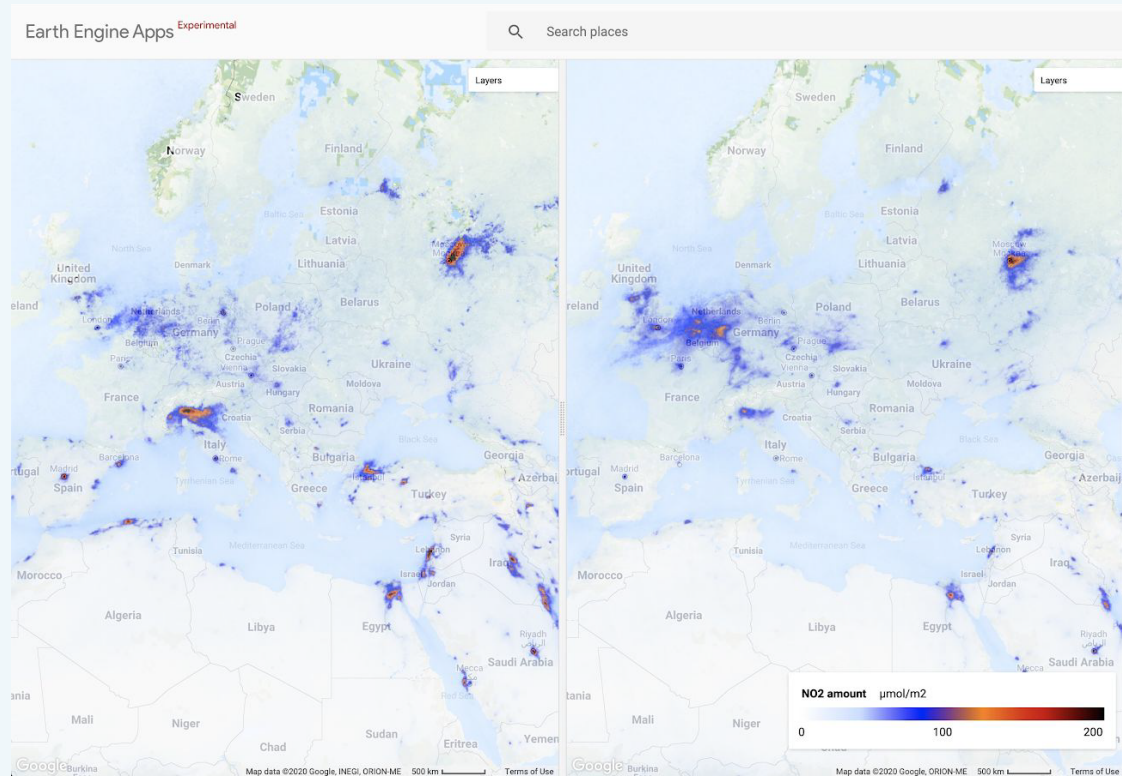

Source: The Economist (Copyright KAL)

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6   See for example: Collective Action and the Evolution of Social Norms, The Journal of Economic Perspectives, Vol. 14, No. 3 (Summer, 2000), pp. 137-158.

7   https://energyandcleanair.org/wp/wp-content/uploads/2020/04/CREA-Europe-COVID-impacts.pdf

Map showing NO2 amount (µmol/m2)

In the same vein, Milan, capital of the province of Lombardy, which was particularly badly affected by Covid-19, recently announced an ambitious scheme to reduce car use after lockdown.

The city had seen traffic congestion fall by up to 75% during the lockdown with knock-on improvements in air quality. The authorities decided they wanted to lock in those improvements by adapting 35km of streets over the coming summer to accommodate an expansion in cycling and walking.[8]

The Central Statistics Office (CSO) reported in early May that the work status of 47% of the Republic's population was affected by the measures introduced to counter the virus with just over one-third of those affected working from home.[9]

Dense smog in Milan (Pre-Covid) Photograph: Flavio Lo Scalzo/Reuters
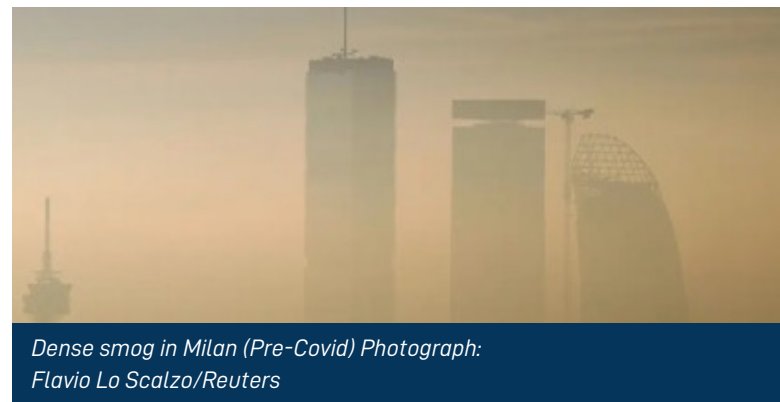
Unsurprisingly, Irish cities saw dramatic falls in traffic during the lockdown period (see over) while pollution from cars dropped by 50% as a consequence.[10]

There is emerging evidence that demand for office accommodation will likely fall in the aftermath of the crisis as employers digest lessons from the period of enforced isolation. For example, Reuters reported that Jes Staley, CEO of Barclays said, "putting 7,000 people in a building may be a thing of the past".

8   The Guardian, 21 April 2020.
9   https://www.cso.ie/en/releasesandpublications/ep/p-sic19/socialimpactofcovid-19surveyapril2020/
10   MaREI

Another banker, Morgan Stanley CEO James Gorman, speaking to Bloomberg, observed that it was clear the firm could operate "with much less real estate" having successfully moved 90% of its 80,000 employees to a work-from-home model in a "surprisingly smooth" operation.[11]

Twitter co-founder and CEO Jack Dorsey told his staff they could work from home "indefinitely" if they chose and the bosses of Facebook and Google have voiced similar comments.[12]

In a national online survey of remote working in Ireland the Whitaker Institute at NUI Galway found that just over half (51%) never worked remotely before the coronavirus crisis. Of these, more than three-quarters (78%) said they would like to work remotely after the crisis is over.[13]

Working in an air-conditioned environment, as many modern offices are, may also not be recommended or desirable as long as Covid-19 remains a threat. It seems likely "virus-laden droplets ($\leftarrow$5 µm) aerosolized droplets can remain in the air and travel long distances, $\rightarrow$1 m".[14]

Effect of Lockdown Measures on Traffic Flows Jan-April 2020[15]

Dublin (IRL)
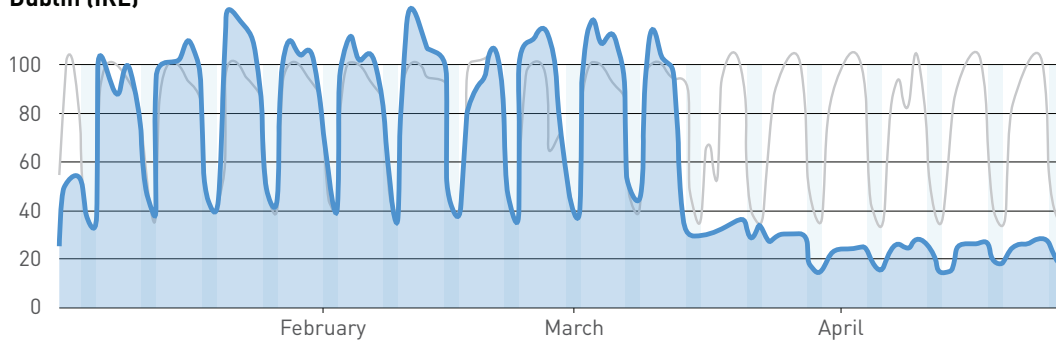
Belfast (GBR)

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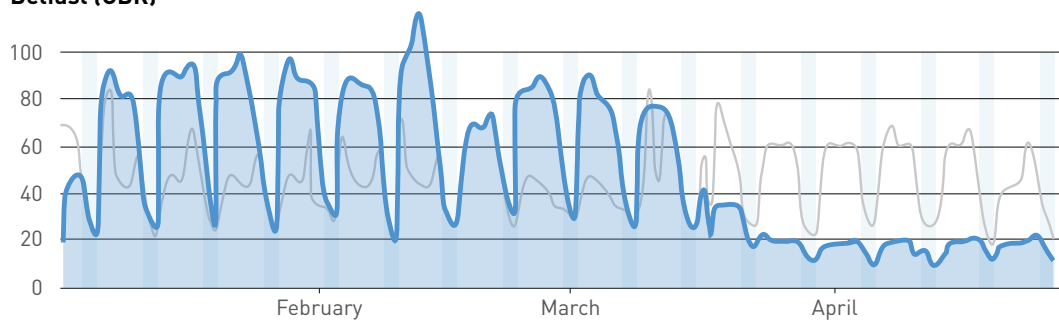
11   Both quotes from Matthew Haag, "Manhattan faces a reckoning if working from home becomes the norm", New York Times, 12 May 2020

12   See USA Today, 13 May 2020

13   http://whitakerinstitute.ie/wp-content/uploads/2020/04/Remote-Working-National-Survey-Report-May-2020.pdf

14   https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article

15   Source: TomTom survey data - https://www.tomtom.com/en_gb/traffic-index/

Cork (IRL)

Limerick (IRL)

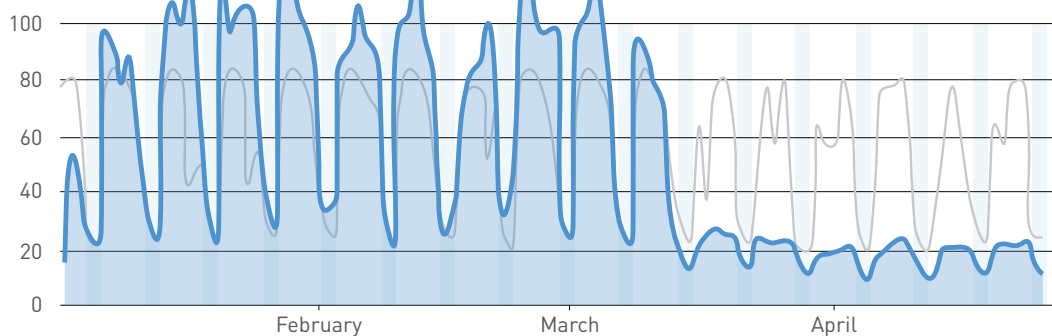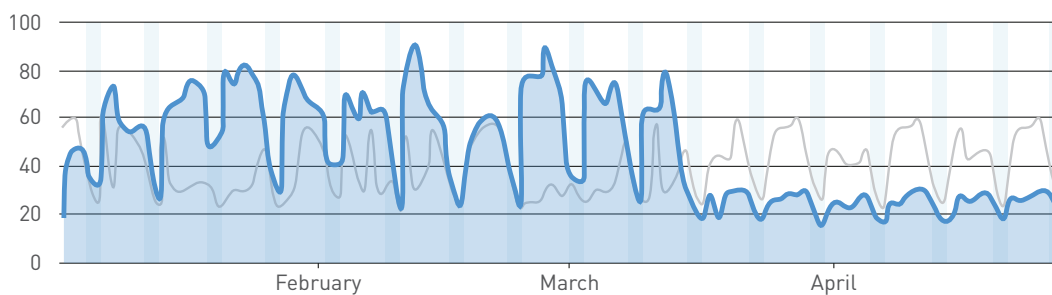The embrace of a working-from-home culture, or what Chris Horn calls a "no-commute culture", by a significant proportion of workers would resonate with government efforts to address the housing crisis.

A key challenge for urban planners is the provision of adequate social and affordable housing in areas of compact growth where walking, cycling and public transport predominate. These "walking neighbourhoods" should be preferentially located in brownfield or derelict sites. These are generally plentiful in well-located areas of Dublin and other Irish cities and towns - albeit often requiring facilitating infrastructure to unlock their potential.

This broadly will be the remit of the Land Development Agency when it is established on a statutory basis together with achieving balanced regional development in the context of the Ireland 2040 national development plan.

Other opportunities that planners should be alert to, where housing might be located in geographically advantageous areas, may arise through the re-purposing of redundant retail outlets or office accommodation.

As a labour-intensive activity, housing development is an important employment activation tool – especially relevant at a time when many will have lost their jobs because of the lockdown.

The Academy recommends that public policy should be fully aligned with any trend away from exclusive reliance on the static office working environment and provide whatever supports are needed to encourage and reinforce the emergent "no commute" culture. This will have implications across a range of areas including land use planning, balanced regional development, home design, public transport, personal taxation, and access to broadband.

The availability of high speed and reliable broadband is clearly very important in the context of home working and trading. The OECD recently concluded "broadband coverage in Ireland is good" and "some 97.4% of small enterprises and 98.3% of medium-sized enterprises benefitted from broadband connectivity" as did more than 80% of households.[16]

In 2019 the Irish Government committed to investing up to €3 billion over 25 years in high speed broadband via the National Broadband Plan. This will progressively bring improved accessibility to an even larger proportion of the population and additional businesses. It will facilitate rural-based economic activity in general and support those wishing to work full or part-time from home.

In Northern Ireland the 10% of premises currently without access to broadband speeds of 30 megabits per second (Mbps) will be connected to next generation access broadband through the project Project Stratum plan that is being part-funded by an Exchequer contribution of £165 million.

The 'High Street' in particular is challenged by the growth of web-based shopping. The experience of the Covid-19 crisis has reinforced this already established phenomenon. The reality is that the role of city and town centres and major shopping complexes has been changing for at least two decades and the Covid crisis has simply underlined and exacerbated the trend.

Digital retail sales in the United States accounted for about 16% of total retail sales in 2019 and this will likely be exceeded in 2020. Retail Excellence Ireland estimates that Irish consumers spent over €6 billion online in 2018 and 70% of this was spent on international websites.

Indigenous retailers will need to establish an online trading presence if they are to claim their fair share of this growing pie. The 2019 OECD report found that although almost all Irish SMEs had a website only 30% were configured to allow them to trade online.

The Academy notes and welcomes the fact that this serious deficiency is currently being addressed by Enterprise Ireland and the Department of Business, Enterprise and Innovation by means of the competitive allocation of enabling grants to the sector.

Reliance on tightly coupled long-range supply chains for critical products and components has been exposed as a major risk in a highly globalised economy. Major international companies may seek to build more resilience into their supply chains. This could create a challenge and an opportunity for the island of Ireland: the challenge is to maintain major investments here and the opportunity is to attract more FDI. Political and economic stability are very important considerations in this context.

In any event, aspects of this development could be good news for Ireland. The medtech sector, North and South, is particularly strong and the Republic is recognised as one of five global emerging hubs of the industry. The sector has well-developed links with third level institutions and employs over 40,000 people with annual exports valued at €12.6 billion annually. Most of the world's top medical technology companies have a base in Ireland; indigenous enterprise is also to the fore as 60% of the 450 plus medtech companies based here are Irish.[17]

The pandemic will have served to reawaken an appreciation by the public of society's vulnerability to global catastrophic events. Very few people had any sense of the possibility of the emergence of a virulent and deadly virus such as Covid-19. Those charged with forward and contingency planning may have fostered some preparedness at government level – or they ought to have - following the SARS and MERS scares of the past twenty years or so.

However, the average citizen will have long forgotten these events. The last comparable event to the present crisis occurred a century ago when the Spanish flu killed 20-100 million people across the globe. It is therefore hardly surprising that people have been shocked by the suddenness, apparent randomness, and vigour of the outbreak. Shocked also by the initial sense of helplessness in confronting the threat and the scale, extent and duration of the highly coordinated mass effort needed to deal with it.

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16   SME and Entrepreneurship in Ireland, OECD, 2019
17   The Irish Medtech Association

Other notable and positive features of the present difficulties are strong, effective and calm leadership articulating a clear, consistent and patently honest message employing the evidence-based knowledge and experience of professional experts. Such an approach can build a powerful consensus by earning and retaining the trust of the public. This is an invaluable lesson for those in authority and is in marked and perhaps ironic contrast to the "we've had enough of experts" attitude encountered during the Brexit debates of recent years.

How is all this relevant to engineering and technology? The answer lies in the subject of climate change. Engineering and technology, as well as evidence based expert advice, lies at the heart of the solutions to this problem. But so do matters of social, economic and political importance. It is the interplay between these forces that the Academy seeks to explore to see what, if any, lessons can be learned and brought forward from the Covid crisis.

While the parallels between the Covid-19 crisis and that of global climate change are not exact, they are proximate. As Barry Commoner, the pioneering environmentalist observed, "the first Law of Ecology" is that "Everything is Connected with Everything Else".

The virus poses a real and immediate threat to people's health, and possibly their lives or the lives of their loved ones, while the negative impacts of climate change seem diffuse and remote in time and location – what former Governor of the Bank of England, Mark Carney, dubbed "the tragedy of the horizon".

However, the Academy believes that lessons in social cohesion and solidarity learned in dealing with the Covid-19 virus could provide a model for how our society should confront the considerably more intractable challenges of climate change and decarbonisation.

These ideas are explored further in the following section.

" **Engineering** and technology, as well as evidence based expert advice, lies at the heart of the solutions to this problem."

6 The Covid Crisis as an Opportunity for Change

What will the post-Covid world look like? What should it look like? Will the Covid-19 crisis and the reaction to it become stimuli for change? If so, what kind of change? These are tantalising thoughts even so soon after the disruption and distress caused by the virus, which will likely be with us for some time to come.

Major epidemics or pandemics through history have had profound impacts on the affected societies from the **Plague of Athens** in 430 BC to the **Black Death** in the 14th century. Indeed, some authors contend that these incidents changed history.[18]

In a recent article in the *Irish Times* the question was provocatively asked: "Is the pandemic our '1945 moment'?"[19] The authors were referring to events in Britain at the end of the Second World War when, barely two months after VE Day, the victorious but exhausted British population elected a Labour Party government by a landslide with a resounding 12% swing from a Conservative Party led by the hugely popular war leader Winston Churchill.

Labour inherited a country close to bankruptcy with a national debt amounting to over 200% of GDP as well as a range of massive challenges in health, education, and housing not to mention shortages of basic foodstuffs. Yet, that Government went on to become one of the most radical and reforming in British history; they completely re-wrote the social contract, created the modern Welfare State, founded the National Health Service and introduced free secondary education for all (over 20 years before Ireland followed suit). This was the 'New Jerusalem' - the Utopia-tinged society, prosperous and egalitarian, Labour leader **Clement Attlee** sought to found on the wreckage of the World War.

Funeral Oration for Pericles after his death in the Plague of Athens

UK Election Poster 1945

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18 See for example: "Epidemics and Society" by Prof. Frank M. Snowden, Yale University Press, 2019.

19 Article by Kevin Callinan and Joe Cunningham, Irish Times, 20th April 2020.

Many commentators explain this dramatic and decisive change of direction in Britain by reference to the experience of austerity, sacrifice and hardship during the war and a determination to create a better country in the aftermath. People simply would not tolerate the old ways of doing things any longer.

Such thoughts are inspiring consideration of how the Covid-19 crisis might precipitate a similar point of inflection in our approach to the world. Rhetorical questions abound: Might this be a similar opportunity to re-imagine the world once Covid-19 is past? Is there a willingness to consider ambitious solutions to other thorny problems facing our society? Problems such as climate change and the associated issues of decarbonisation and resource depletion?

Might there even be an appetite to build a modern version of Attlee's 'New Jerusalem' – prosperous, egalitarian but also environmentally sustainable and biodiverse? Or, as characterised by the language of the EU in its recent publication 'A Circular Economy Action Plan', *"a climate-neutral, resource-efficient and competitive economy"*.[20]

This is in effect the same thing as "a sustainable economy". **Intergenerational equity is a key principle in sustainable development; each generation has the right to inherit the same diversity in natural and cultural resources enjoyed by previous generations and to equitable access to the use and benefits of these resources.** In our present circumstances it means that we should consider using the debt incurred in re-launching the economy after the present crisis in such a way as to ensure future generations do not have to face the potentially catastrophic distress and disorder consequent on unresolved climate change.

There is an alleged gradient in environmental awareness in the current mix of generations – baby boomers (born before 1965), Gen X (before 1981), Gen Y or Millennials (before 1996) and Gen Z (before 2012) – with younger folk generally held to be more sympathetic (and radical) than their elders. The pioneering and visionary leadership of the teenage activist Greta Thunberg and the associated Extinction Rebellion movement may perhaps have influenced this perception. In reality however, it seems likely that a majority in all demographic groupings are much more sensitised to the main issues than heretofore and so are more receptive to the need for action.

This view is borne out by polling. A recent (mid May) opinion poll by **Friends of the Earth** found that "seven in 10 Irish citizens feel 'very strongly' that a failure to act on climate change is a failure to act in the best interests of the people of Ireland. This view is held most strongly among those aged under 35, with 76% agreement within that cohort - however only 23 per cent of respondents either 'disagree strongly' or 'disagree somewhat'. Further, some 90% of respondents believe Irish climate-change policies should be guided by science rather than politics – as was the case with Covid-19.

67% of all respondents polled believed it was important that "government actions prioritise climate chage in the economic recovery after Covid-19". There was a clear majority in favour of this proposal across all age groups and regions.[21]

Similar polling by Ipsos[22] conducted across 14 countries globally (not including the Republic of Ireland) shows that 71% on average believe that in the long-term Climate Change is as serious a crisis as Covid-19. Respondents from China were the most likely to believe that in the long-term climate change is as serious a crisis as Covid-19 at 87%, while respondents from the USA and Australia are the least likely, but still well over half at 59% agreeing. Britain was midway between these two extremes at 66%.

Globally 65% agreed that it is important that climate change is prioritised in the economic recovery after Coronavirus.

These results confirm there is a widespread receptivity amongst populations for the recovery from the Covid crisis to be a "green" one. This support provides fertile ground for governments seeking to promote and implement environment-friendly measures – possibly even quite ambitious ones.

20   Brussels, 11.3.2020 COM(2020) 98 final.
21   https://www.foe.ie/assets/files/pdf/friends_of_the_earth_climate_action_opinion_polling_may_2020.pdf
22   https://www.ipsos.com/sites/default/files/ct/news/documents/2020-04/earth_day_slide_deck.pdf
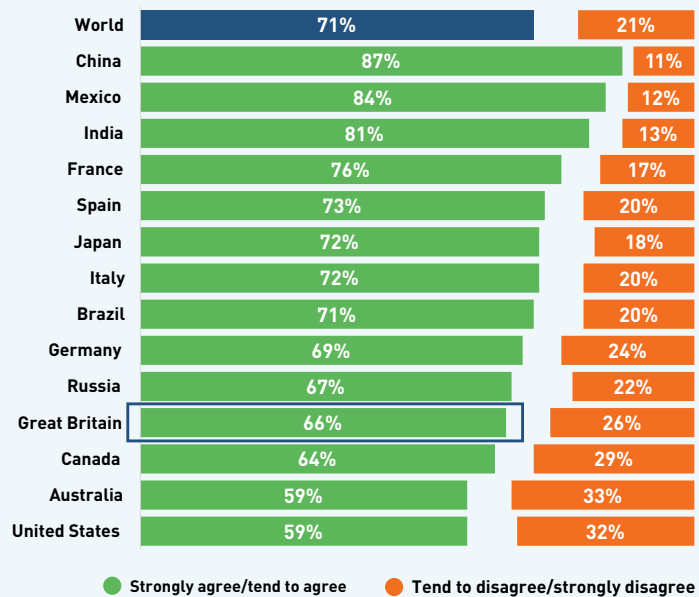
Seriousness of climate change in comparison to Covid -19

Country data

Q. To what extent do you agree or disagree with the following:

In the long term, climate change is as serious a crisis as Covid-19 is

Country	Strongly agree/tend to agree	Tend to disagree/strongly disagree
World	71%	21%
China	87%	11%
Mexico	84%	12%
India	81%	13%
France	76%	17%
Spain	73%	20%
Japan	72%	18%
Italy	72%	20%
Brazil	71%	20%
Germany	69%	24%
Russia	67%	22%
Great Britain	66%	26%
Canada	64%	29%
Australia	59%	33%
United States	59%	32%

Base: 28,029 online adults aged 16-74: Fieldwork dates: Thursday 16 to Sunday 19 April.

● Strongly agree/tend to agree   ● Tend to disagree/strongly disagree

Support for a 'green' economic recovery from Covid-19

Country data

Q. To what extent do you agree or disagree with the following:

In the economic recovery after Covid-19, it's important that government actions prioritize climate change

Country	Strongly agree/tend to agree	Tend to disagree/strongly disagree
World	65%	25%
India	81%	13%
Mexico	80%	14%
China	80%	16%
Brazil	66%	22%
Japan	64%	22%
Italy	63%	27%
France	63%	26%
Spain	62%	26%
Canada	61%	30%
Russia	60%	24%
Great Britain	58%	31%
Australia	57%	34%
Germany	57%	33%
United States	57%	32%

Base: 28,029 online adults aged 16-74: Fieldwork dates: Thursday 16 to Sunday 19 April.

● Strongly agree/tend to agree   ● Tend to disagree/strongly disagree
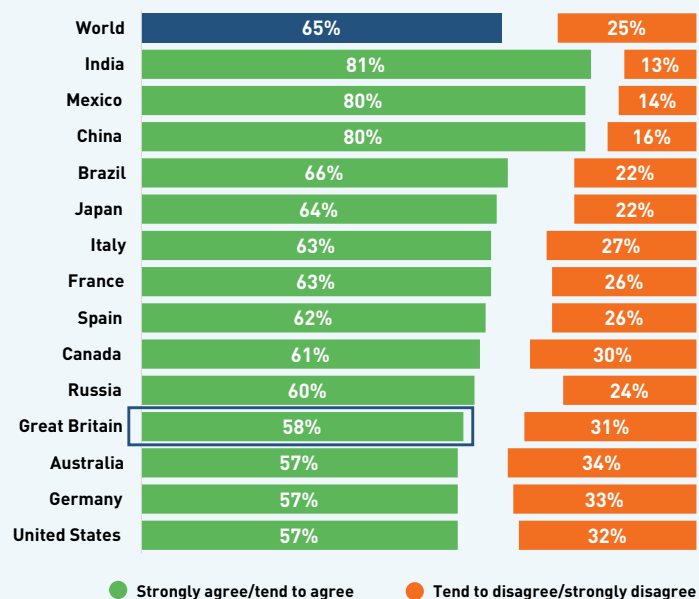
Recommendation 2

The Academy recommends that government, in imagining and developing policies to deal with the immediate aftermath of the crisis and the rejuvenation of the economy, should ensure such policies can also promote a "greener" future.

Desirable and important as popular support is, there are in the view of the Academy, many other reasons for pursuing the green or sustainable path.

Man's influence on all aspects of natural environment is now so all-pervasive that many suggest this era should be called **the Anthropocene**. With a continually growing population and a relentless quest for land and raw materials mankind is encroaching on ever more remote areas of wilderness and environments hitherto the exclusive domain of animals. The results are ecological degradation and loss of biodiversity "at a rate unprecedented in human history" – as expressed by **Minister Josepha Madigan** in the Dáil in 2019.[23]

The Minister was confirming that the destruction was "not just over there in the Amazon Basin or Borneo" but that there were "worrying and ongoing" declines in biodiversity in Ireland. This was made clear when the 6th report to the UN Convention on Biological Diversity was published by the National Parks and Wildlife Service in 2019. Most of the main causes identified in Ireland were associated with land use practices: intensive agriculture, forestry and over-exploitation of peatlands.

It is worth noting that many of these practices also contribute negatively to net Irish emissions of greenhouse gases and have attracted some unequivocally critical comment from the **Climate Change Advisory Council.** For example, the Council noted that there was an "urgent need for changes in management within agriculture, forestry and other land uses" and that "the drainage of peat for multiple land uses, including peat extraction, must cease".[24] The Academy concurs in this view.

Internationally, the 2019 Global Assessment Report on Biodiversity and Ecosystem Services by the Intergovernmental Platform on Biodiversity and Ecosystems Services (IPBES), warns that nature is declining globally at rates unprecedented in human history, and that the rate of species extinctions is accelerating, with grave impact on the goods and services provided by nature and for people around the world.

Amongst the no doubt many lessons to be derived from the Covid-19 experience is that mankind must be much better prepared next time in terms of training, emergency stocks of essential equipment and a built-in "sprint" capacity in the healthcare system at local, State and EU level, so that our responses are not constrained or restricted by deficiency.

But surely now is also the time for a hard-headed, clear-sighted acceptance of the reality that a functional and thriving natural world is essential for the survival of the human race. Policies and practices are urgently required that enhance the respect shown for the natural world and the reservoir of plants and animals that share the planet.

This would be a sensible recognition of the risks we run by ignoring the welfare of the natural world. Research confirms the continuing decline in a broad range of species and the degradation of natural environments represents a serious threat to human wellbeing on a number of fronts.[25] On this note it is thought the risk of viral transfer to humans of zoonotic diseases is increasing and will remain high. Pandemics, of which those that have arisen in the past twenty years - Covid-19, SARS, MERS - may only be harbingers.

So what is good for humans is also good for ecosystems and the animals and plants that inhabit them and vice versa. This is the essence of **the "One Health" approach** to designing and implementing policies in this area endorsed by the World Health Organisation (WHO). It is also an approach supported by the Department of Agriculture in the Republic – at least in relation to the serious public health concern of Antimicrobial Resistance.[26]

23   Statement by Minister Josepha Madigan to the Dáil, 29 May 2019

24   http://www.climatecouncil.ie/media/Working%20Paper%20on%20Agriculture%20and%20Land%20Use.pdf

25   For example: Bloomfield, L.S.P. et al, Habitat fragmentation, livelihood behaviours and contact between people and non-human primates in Africa, Landscape Ecology, 35, 985-1000 (2020); Jones, K.E. et al, Global trends in emerging infectious diseases, Nature, 451, 990-993 (2008)

26   https://www.gov.ie/en/press-release/056f2e-one-health-2018-a-joint-approach-for-healthcare-and-veterinary-profe/?referrer=/blog/press-release/one-health-2018-a-joint-approach-for-healthcare-and-veterinary-professionals-a-one-health-event-to-mark-european-antibiotics-awareness-day-2018/

The ONE HEALTH approach recognizes that

HUMAN   ANIMAL   ENVIRONMENT HEALTH cannot be separated

World Health Organization
REGIONAL OFFICE FOR Europe

ANTIBIOTICS HANDLE WITH CARE

The Presidency of the EU has issued a call to the European Commission to develop "without any delay an ambitious, realistic and coherent 2030 EU Biodiversity Strategy as a central element of the European Green Deal addressing both the direct and indirect drivers of biodiversity loss and ecosystem degradation, including objectives for habitats and species conservation, and applying the precautionary principle and the ecosystem approach".[27]

" Ireland – the island - has **considerable international influence** at its disposal."

The Academy recommends that Ireland, as part of its embrace of sustainability, should support the renewed and strengthened EU Biodiversity Strategy as part of the Green Deal and ensure its implementation in Ireland.

Biodiversity loss is linked to climate - the central issue of our time. Both issues represent existential threats to the future of mankind. Even if some reject the notion of a climate emergency there is nonetheless common ground that mitigation and adaptation efforts are now essential if we are to avoid catastrophic outcomes within the lifetimes of many alive today.

It is recognised that Ireland has limited power to make any meaningful reduction in carbon emissions or improvement in biodiversity beyond its own shores. As the noted Northern Irish philosopher **Onora O'Neill** observed recently, "climate change – like pandemics, knows no borders and cannot be achieved without co-ordinated action and forward planning. Just as there is no way of ensuring that epidemics stay where they started, so there is no way of ensuring that climate change can be averted by local action alone".[28]

However, Ireland – the island - has considerable international influence or "soft power" at its disposal. The Republic, as a sovereign state, is a member of the EU and of the wider world community. In that role it has a long and respected tradition of engaging and influencing international forums from the former Free State's diplomatic activism in both the League of Nations and the Commonwealth in the 1920s and 30s through to its current roles in Europe and the UN – where it is seeking to win a seat on the General Assembly in June 2020.

In short, there is no practical impediment to Ireland now becoming, should it choose to, an international standard bearer for the cause of climate action, biodiversity, and sustainability. Mere words will not be enough though, action will be needed to establish and maintain credibility.

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27   https://data.consilium.europa.eu/doc/document/ST-15067-2019-INIT/en/pdf
28   The Irish Times, 12 May 2020

7 The EU Dimension

As the incoming European Commission has put climate change at the top of its agenda as part of the **Green Deal**, a suitably motivated Ireland will be pushing an open door – even in the challenging circumstances that will likely prevail in the short to medium term. This difficult period will be alleviated to a large degree by the deployment of significant European stimulus funds and by national borrowing.

On 16 April 2020, **President Ursula von der Leyen** emphasised in a speech in the European Parliament plenary that the EU's collective response to the Covid crisis had been unprecedented in scale, **amounting to over €3 trillion.** The President went on to say **"But we know we will need more. A lot more".** She also explored the future of the EU post-virus and highlighted the scale of the challenge facing the EU as one that requires a redefinition of the Union's internal and external policies in preparation for the new global reality after Covid-19 and concluded **"we need a Marshall Plan for Europe's recovery and it needs to be out in place immediately".**

The President said that Europe's recovery must focus on 1) strengthening resilience by diversifying and shortening supply chains, which is also good for the environment, 2) the green transition including the circular economy and 3) the digital transition involving investment in innovative technologies and infrastructure (5G) and improved cyber resilience.

These have fed into the three-pillar recovery strategy agreed between President von der Leyen and President Michel on 22 April 2020. The recovery strategy contains many of the same objectives originally set out in the EU's Strategic Agenda for 2019-24 including the European Green Deal and digital transformation, but the methods have been re-framed in the light of the current situation.

The recovery is to be financed primarily by the multi-annual financial framework (MFF), i.e. the EU budget, which would act as a **"Marshall Plan for Europe"** and a "recovery instrument" using funds borrowed by the Commission on the capital markets and guaranteed by the Member States.

The bulk of these funds will be spent in the first pillar which will in turn be "focussed on those parts of the Union that have been most affected and where resilience needs are greatest". The funds will be used to support "key public investment and reforms aligned with our European priorities", i.e. achieving a carbon-neutral, digitised and resilient economy.

The second pillar is about "kick-starting the economy and helping private investment" and the creation of a "Strategic Investment Facility". The third pillar is "about learning the most immediate lessons of the crisis" strengthening programmes that have proved their worth (e.g. Horizon Europe) and creating a new, dedicated Health Programme.

President Von Der Leyen opined that "sooner or later our scientists will develop a vaccine against coronavirus...for climate change, however, there is no vaccine...and that is why Europe must now invest in a clean future".

The President presents her vision to the European Parliament

The Commission launched its proposal for a recovery instrument as **"Next Generation EU"** on 27 May 2020. The instrument will be worth €750 billion and when "targeted reinforcements" of the EU budget (total: €1.1 billion) are added in the "total financial firepower of the EU budget" climbs to €1.85 trillion over the period 2021-2027. Some €500 billion of the recovery instrument will be provided as grants with Ireland expected to receive €1.9 billion. The European Parliament's approval of this plan is pending.

Subject to that approval, the Green Deal will underpin the EU's recovery strategy and will comprise:

- A massive renovation programme for buildings and infrastructure.

- A more circular economy, which will generate employment opportunities.

- Renewable energy projects, including wind and solar and initiating a "clean hydrogen economy for Europe".

- Cleaner transport and logistics, including the installation of one million charging points for electric vehicles (EVs), a boost for rail travel and clean mobility in cities and regions.

- A strengthening of the Just Transition Fund to support re-skilling and help businesses create new employment opportunities.

The Just Transition Fund of up to €40 billion is being established under Next Generation EU specifically to assist Member States in accelerating the transition towards carbon neutrality.

The Green Deal areas itemised above, together with those relating to enhancing resilience and promoting the digital economy, will provide the main focus for the sectoral papers that the Academy is preparing to follow on from this overview.

The Circular Economy and the Technological Revolution

The circular economy initiatives of the Green Deal will build on actions dating from the late 1990s and early 2000s during an earlier generation of European environmental activism.

One of the key legislative measures introduced by the European Union at that time was the Waste Electrical and Electronic Equipment (or WEEE) directive (2003). The directive (subsequently amended) sought to achieve a high level of recovery of the often valuable components (e.g. precious metals) of electrical and electronic equipment that was at the end of its useful life with safe disposal of the remainder. Many of the components were also toxic and if not handled properly or casually disposed of they represented a serious hazard to human health and the environment.

The directive has been partially successful in that it has led to the development of an end of life product recovery industry and is a significant and highly visible step in the development of the circular economy.

However, when viewed in the light of the waste hierarchy, i.e. Reuse, Recycle, Recover, Dispose (in descending order of merit) – it is disappointing. *Reuse* of WEEE material is minimal, *Recovery* and *Recycling* tends to be limited to easily salvageable materials while too much reliance is still being placed on *Disposal* (to landfill). The campaign group **Countering WEEE Illegal Trade** (CWIT) estimates that only 35% or 3.3 million tonnes "ended up in the officially reported amounts of collection and recycling systems" in 2015.[29] Tens of thousands of tonnes of valuable and potentially toxic materials simply vanished – often to less advanced economies in Asia, Africa and Latin America where environmental oversight is minimal or unreliable or both.

Greater recycling of WEEE (and other materials such as packaging) can result in domestic dismantling employment opportunities, reduced demand for expensive raw materials (which can often involve serious environmental degradation), a reduction in the disposal of potentially toxic components and lower energy consumption as it generally requires less energy to recover and recycle or reuse a metal or plastic component than to create it from new. Hence recycling delivers important benefits from the perspective of achieving a carbon neutral economy.

While the WEEE directive was radical and innovative for its time a much more ambitious plan is now warranted based on circular economy principles resulting in minimum waste and using maximum recycling and production and use of renewable energy.

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29   http://www.cwitproject.eu/wp-content/uploads/2015/08/CWIT-Final-Summary1.pdf

The Circular Economy

The EU Commission's recent "A Circular Economy Action Plan" – part of the Green Deal - seeks to create "a cleaner and more competitive Europe". Recognising that 80% of a product's environmental impacts are determined at the design phase the Commission intends to propose a sustainable product policy legislative initiative. The intention is to widen the **Ecodesign Directive** beyond energy related products.

Legislation (domestic and EU) should place an explicit requirement on manufacturers that products be designed or redesigned with reuse and recovery in mind. Products should be 'smart' or 'intelligent' so that they carry with them a profile of their design, constituent parts, history of use, service, etc. which can then be made available to support upgrading, reuse and recovery at 'end of life'. This is all readily possible now using existing RFID technology and embedded sensor and memory devices.

Investment is accelerating in the rapidly emerging areas of cloud, Internet of Things (IoT), nano-technologies, blockchain, artificial intelligence and micro sensors.

5G wireless technology will deliver higher multi-Gbps peak data speeds, ultra low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. By 2021, it is expected that 50 million people worldwide could be using 5G. This figure could be rising to 1.2 billion people by 2025.

These advancements offer increasingly sophisticated and innovative technical solutions that will greatly facilitate the development of all the elements of the circular economy.

For example, design for reuse, disassembly and recycling can be combined with memory embedded chips inserted in consumer and capital goods products providing computing and communications capacity that will assist the automated de-manufacture of those products and the recovery of the component materials.

Blockchain infrastructure can be deployed to capture data from IoT sensors using cryptographic signing techniques to create immutable data records. Machine learning and artificial intelligence deployed through trusted data will help enable automated command and control to optimise performance and consumption across the system. Blockchain records can also be used to ensure regulatory compliance and help eliminate current illegal disposal pathways.

Mike Hayes, KPMG's Global Renewables Leader, based in Ireland, has said, in relation to the impact of these developments in the field of climate action, "the application of these technologies across value chains will transform supply and demand economies for carbon by creating transparent and auditable models for consumption measurement, accounting and carbon footprint management through decarbonisation strategies".[30]

Together, the developments reviewed above represent nothing short of a technological revolution. Ireland is well placed internationally with regard to these technologies. Enterprise Ireland reports that Ireland has more than 1,000 companies operating in the digital technology sector. These companies had combined annual sales of more than €6.5 billion and exports of €3.6 billion in 2018.[31]

Recommendation 4

The Academy recommends that the ambitious agenda of the circular economy and the associated technological revolution should be promoted as part of a progressive and successful greening of the economy in both jurisdictions on the island.

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30   Quoted in Harnessing Technology Change to Manage Climate Change, kpmg.com, 2020.

31   See "Irish digital technology sector thriving with annual sales of over €6.5bn", Irish Times , March 12, 2020.

8 The Role of the State

The State will inevitably be more powerful and more involved in the lives of citizens post-Covid than heretofore. This is an unavoidable consequence of the huge public sector interventions required to secure the economy and ensure a devastating depression is avoided. In many ways the State and the public sector in general are at their best when effectively led and dealing with a major disruption to the economy and society.

Again, the analogy of wartime measures comes to mind. In such crises the State alone has the capacity to respond, whether as an effective and convincing backstop in fiscal and monetary terms, or in pulling together all strands of society to respond to a crisis such as the present pandemic. It is the reinsurer of last resort.

Industry and business are set to benefit significantly from grants, soft loans and a range of other incentives to save them from collapse and as part of the rejuvenation of the economy. Such supports should be used wherever possible to promote the circular economy and the overall green agenda and should only be provided with strict sustainability "strings" attached.

There will come a time when the State will step back to provide the space for business to revive and recover its innovative and entrepreneurial instincts and grow the economy within the parameters of policies set by the State. The latter must encourage a re-energised private sector to develop the market-based solutions whose ultimate success depends on their acceptance by consumers.

The State itself may take the lead in areas of market failure. This was the approach adopted in the early years of the life of the nascent Irish state when successful publicly-owned but commercially run organisations such as the ESB, Aer Lingus and the Irish Sugar Company were established to provide essential services that the private sector had failed or was unable to provide. There may well be a lesson in this part of the Irish past that has particular relevance for Ireland's future.

Reference has already been made to the real and significant risk, in addressing the urgent need to rebuild the economy post-Covid, the critical, i.e. action on climate change and associated matters such as reversing biodiversity loss, will get postponed and diminished. This risk must be avoided, and the Academy urges the State authorities in both jurisdictions to develop balanced initiatives, which deal with short-term issues in a manner that ensures long-term benefit.

The Academy believes the implementation of measures to achieve decarbonisation, the circular economy, enhanced biodiversity and a just transition will not only ensure we avoid serious longer-term economic and social problems on a scale much greater than those posed by the Covid-19 threat but will also result in significant economic and employment gains.

The fiscal and policy interventions employed to rebuild the economy post-Covid must be designed and implemented in a manner that facilitates this goal. With interest rates as low as at present such investment in climate-resilient infrastructure makes also makes sense.

However, threats are emerging to the recovery plan envisaged by President Von Der Leyen, not least from Poland, Czechia, Hungary and other Eastern European member states. These attitudes are regrettably, even foolishly, short-sighted.

For example, the Czech Prime Minister, Andrey Babis, said recently that "Europe should forget about the Green Deal now and focus on coronavirus instead". Poland's deputy minister of state affairs, Janusz Kowalski, meanwhile demanded the European Emissions Trading System (ETS) to be abolished from next year on, or Poland to be excluded from the mechanism, to alleviate economies affected by the coronavirus epidemic.[32]

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32   Reported in Recharge, 18 March 2020.

Recommendation 5

The Academy recommends that Ireland should be clear and strong in its support for the EU Green Deal and oppose any attempt at EU level to abandon or unwind hard won progress in other areas of the environmental agenda, including the Emissions Trading System.

There will be opposition at home as well. Already there is an emerging political bipolarity between those broadly supportive of the (non-party political) "green" agenda and those apparently in opposition to it. This process is not always driven by scepticism *per se* but rather more by a legitimate fear of change. It is clear that much will have to change if the decarbonisation process and associated developments are to be successful.

The Academy believes that fear of necessary change can best be addressed by seeking to harness the spirit of community solidarity invoked by our collective response to the coronavirus threat.

The design and implementation of essential measures must take place and be seen to take place in a transparent, fair, and balanced manner and be firmly rooted in the democratic norms of our society. **Trust is central to this process. The stakes are high and a loss of public trust in the ability of the democratic process to deliver fair and reasonable solutions for all can lead to undesirable outcomes.**

Guidelines for a "just transition towards environmentally sustainable economies for all" were set down by the International Labour Organisation in a 2015 publication.[33] The guidelines have been applied by governments across the world, including Ireland and Scotland. The Irish Government has moved, for example, to ensure that the closure of the peat-fired electricity generating stations in the Midlands will be accompanied by a just transition.

The concept was defined in a lapsed Bill, introduced by the **Green Party** in the last Dáil as, "the bringing together of workers, communities, employers and government in social dialogue to drive the concrete plans, policies and investments needed for a fast and fair transformation to a low carbon economy and to ensure that employment jobs in the new economy are as decent and as well-paid as those left behind".[34]

The **Citizens' Assembly** deliberated on the subject of climate change in 2017/2018 and issued far-reaching recommendations in its 3rd Report in April 2018. The Oireachtas responded by setting up a **Joint Committee on Climate Action** which reported in March 2019. Subsequently in May 2019 the Dáil symbolically declared a **"climate and biodiversity emergency"** becoming only the second legislature to do so after the UK. The process culminated in publication by the Government of the Climate Action Plan in June 2019.

In its 2019 Working Paper on "Climate Change Mitigation and the Irish Agriculture and Land Use Sector" the **Climate Change Advisory Council** noted "the success of participatory approaches to engagement, for example the Citizens' Assembly". The Academy shares the view of the Council that this approach helps "to facilitate engagement and ultimately strong stakeholder ownership of mitigation policies, which....help to achieve a just transition".[35]

Recommendation 6

The Academy recommends the most practical way to build consensus, avoid undesirable social and economic outcomes and achieve the goal of a sustainable, decarbonised economy is by re-tasking the Citizens' Assembly with proposing the most equitable way of transitioning to a decarbonised, sustainable economy with key milestones in 2030, 2040 and 2050.

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33   https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_432859.pdf
34   Just Transition (Worker and Community Rights) Bill, 2018
35   Climate Change Advisory Council, op.cit.

9 The Immediate Challenge: Re-opening the Economy

In thinking about how the communities on the island of Ireland should respond to the challenge of the post-Covid world, the Academy believes there are a number of lessons that can be learned and opportunities taken based on the experience of dealing with the pandemic. Some are quite specific and short-term others are more general and medium to long term – as has been explored in the foregoing.

It is trite to say that the effect of the pandemic has been disruptive. As noted, it is also likely to be accelerative; developments or trends long in gestation or on the fringes of adoption can rapidly become established facts of life and suddenly the future is the present. So it is now.

Home working and remote studying are examples of this phenomenon. The enforced travel bans have meant that the normal fact-to-face transactions between individuals or groups in a whole range of areas such as medicine, education and the law have had to be superseded by remote encounters via phone, email or videoconference.

There is no doubt that the benefits in terms of lifestyle, wellbeing, reduced traffic congestion, improved urban air quality and carbon footprint could be enormous if this practice were to be adopted as a permanent lifestyle by an appreciable section of the commuting public.

There are short-term difficulties to overcome before a return to anything like "normal" commuting and working behaviour can happen, depending on the social distancing rules to be observed (see below).

It is unlikely there will be a defined point in time when the economy reopens. Not only can the world never return to its pre-Covid way of life but restrictions on inter-personal and economic activity can only be lifted on a gradual basis and over a relatively extended period of time. It is possible there will be occasional or periodic reversions to greater restrictions locally, nationally, and internationally in response to flare-ups of the disease until such time as there is a vaccine or reliable therapeutic treatments.

It is obvious at this point that the major challenge facing the leadership in both jurisdictions on the island over the coming months is the re-launch of the economy by the progressive removal of crisis-inspired restrictions. Both jurisdictions have published "road maps" setting out timelines or thresholds for this progressive re-opening. The Republic's road map features a series of actual calendar dates from May through to August 2020. The Northern Ireland plan avoids dates as the Executive explained it would be led by the science and not by a "calendar setting artificial deadlines".

Flexibility will no doubt inform the responses in both jurisdictions – dates can be changed and phases extended or curtailed depending on progress.

The Academy envisages the re-opening process as taking place in two broad stages. Stage 1 is the gradual and tentative re-opening of the economy which will likely extend through the autumn of 2020 into the early months of 2021. Stage 2 is the longer, more difficult task of reinvigorating what may be a deeply damaged economic system.

Stage 1 is fraught with risk as a lockdown-weary public afforded ever more liberty may become careless. The risks are especially great if the means of mass testing, tracking and isolation remain under-developed. The danger of a second wave will remain high and could be further aggravated by the onset of the usual winter flu season in the autumn of 2020 – all in the presumed absence of therapies or a vaccine for Covid-19.

However, once successfully navigated the real task of re-building the economy can begin in earnest in Stage 2.

Stage 1 – A Gradual Re-opening

The European Commission emphasises the point that efforts to fight and contain the virus should be continued in the initial phase of economic revitalisation.

More generally, the experience of **China** may provide a guide as to how the Irish economy will behave towards the end of Stage 1. In that country, even after restrictions were lifted and people were free again to patronise shops and restaurants, "large chunks of everyday life is missing".[36] Spending remained down as the effect of mass unemployment is felt and citizens behave cautiously and tentatively given the remaining threat posed by the virus. Road and air traffic volumes and hotel occupancy remain well below pre-crisis levels and are recovering only slowly. Some observers predict that business travel and demand for office space in Chinese cities will be permanently impacted.[37]

There will be a need to maintain social distancing rules for some time to come. Without an ability to maintain the necessary distance many people will not feel comfortable using public transport or returning to work.

In a survey of 300 professionals, **Mason, Hayes, and Curran** reported that, "most...are optimistic...with 74% believing their centralised workplace will be re-opened by September 2020. Only 7% believe it will be later than September 2020, and 1% are leaning towards their workplaces opening in 2021". However, the majority of those surveyed did "have concerns over potential obstacles to the re-opening of workplaces, with 51% stating that difficulties around social distancing may delay employees returning to offices and workplaces, and 24% stating that employee concerns over further virus transmission may also be an obstacle".[38]

Employers retain a legal obligation to ensure workplaces are safe and will not want to expose themselves unnecessarily to litigation on this issue.

The difficulties facing the retail sector, the so-called High Street, have already been discussed. The immediate issues are simply a magnification and accelaration of problems long in gestation. The Irish Times recently reported on a survey of "360 chief executives operating 4,500 outlets" in the retail sector carried out by industry body **Retail Excellence Ireland.**

The newspaper reported that "Even after lockdown is unwound, **most retailers are facing a financial disaster** due to capacity reductions from stringent social distancing, as well the effects of general economic malaise and consumer fear. Chief executives across the sector predict an average total decline of almost a quarter in the crucial Christmas shopping period of November and December. Some sectors, such as jewellery, predict declines of more than a third in sales this Christmas. Most sectors will see growth in online sales, but many are coming off a low base and it won't come close to making up for the in-store declines".

The sector is calling for an urgent re-think of the re-opening road map.

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36   "The 90% Economy", The Economist, 30th April 2020.

37   Thomas Leung, Managing Partner, PwC Mainland China and Hong Kong, Webinar, 4 May 2020

38   https://www.mhc.ie/latest/news/getting-ireland-back-to-work-survey-results-announced

The current **social distancing** requirement also places a considerable query against the capacity of many working environments – offices, schools, colleges, factories - to safely and legally accommodate pre-Covid numbers. It remains to be seen if the separation distance will be maintained at 2m or reduced to say 1.5m, or even 1m.

Theatres and cinemas, which cannot re-open in the Republic until after August 10th, are reported to require attendances in excess of 60% to break even – difficult to achieve with a separation distance of 2m but possible at 1m. Anecdotal evidence also suggests that many restaurants and bars could function economically if the distance is reduced to 1m. A large Dublin accountancy firm estimated it could accommodate only some 30% of its employees, currently working from home, in its offices at a separation distance of 2m but this would rise to 70% with a distance of 1.5m and nearly everyone at 1m.

The same problem faces **schools and colleges** planning for September unless the recommended distance is reduced.

Capacity is an issue for **public transport** too - it is dramatically reduced by the need to ensure a 2m separation distance between passengers – the UK Transport Secretary estimated the public transport system in that country would be reduced by 90%.[39]

Irish commuters, ironically and notoriously, are much less reliant on public transport; of the nearly 2 million workers who commute to work daily in the Republic the great majority (c.70%) use their own car or van and presumably will continue to do so.[40] Commuters who have to travel to work and normally use public transport may have to find alternative modes.

Aviation has been particularly badly affected by the measures adopted to control the virus – indeed the industry has all but collapsed. The European industry body, Eurocontrol, estimates that the number of flights operating in Europe in the spring of 2020 is down nearly 90% on the same period in 2019.

Air travel has mushroomed over the past two decades with exceptionally strong growth in Asia giving rise to what some have term a "hypermobile" world. The sector is estimated to contribute about 3.5% annually to global carbon emissions – relatively small but, until the crisis, forecast to continuing growing with pace to the mid decades of the century and beyond. Restoring the industry to anything approaching its previous scale is severely problematic for governments trying to balance economic revival with a reluctance to simply facilitating a return to a fundamentally unsustainable "business as usual" trajectory.

Currently, there is no consensus as to how the airlines can practically combine the likely ongoing need for social distancing between passengers into 2021 with profitable operations. Recovery in the sector is likely to be a prolonged affair and demand may never again reach the level seen in 2019.

This outcome would have significant implications for several important elements of the Irish economy. **The aviation sector is particularly important to Ireland on a number of fronts.** The island is a world centre of aircraft leasing - Irish lessors own about 25% of the world's aircraft and the sector employs about 4,000 in the Republic. Bombardier/Spirit employs 3,500 in the manufacture of aircraft wings in Belfast. As an island, good air links are critically important for international communication, trade, and tourism. Irish CEOs run two of the largest airlines in Europe – Ryanair and IAG.

Dublin airport is the principal gateway to the island and, until this Spring, capacity was being strained by the exceptional growth in passenger throughput of recent years – up 57% in the period 2013-2019 to 31.5 million passengers. A new runway is currently under construction at the airport that will relieve the pressure and facilitate further growth. The airport authority estimates the facility contributes nearly €10 billion in Gross Value Added (GVA) to the Irish economy.[41]

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39   The Guardian, 9 May 2020
40   https://www.cso.ie/en/releasesandpublications/ep/p-cp6ci/p6cii/p6mtw/
41   Dublin Airport Authority, January 2020

Additionally, the Irish hospitality industry, which is worth nearly €6 billion in income for both economies and supports upwards of 325,000 jobs across the island, is in real danger of being devastated by the collapse in travel.[42] This sector is also affected at present by the rule requiring all visitors to Ireland to self-quarantine for 14 days.

The short term outlook for the whole travel and hospitality sector in Ireland from the present perspective of early summer 2020 is unfortunately grim and reflects that of the **UN World Tourism Organisation** which foresees a reduction of up to 80% in global tourist numbers this year with up to 100 million jobs at risk.[43]

It is clear that rules on social distancing will have a critical influence on the evolution of the short-term revival of the economy. It is to be expected that as the incidence of the virus in the community falls to new lows or even zero and as arrangements for testing, tracing and isolation of fresh outbreaks mature then it is possible to envisage a relaxation in the current 2m rule – particularly if face coverings are recommended in certain scenarios such as public transport.
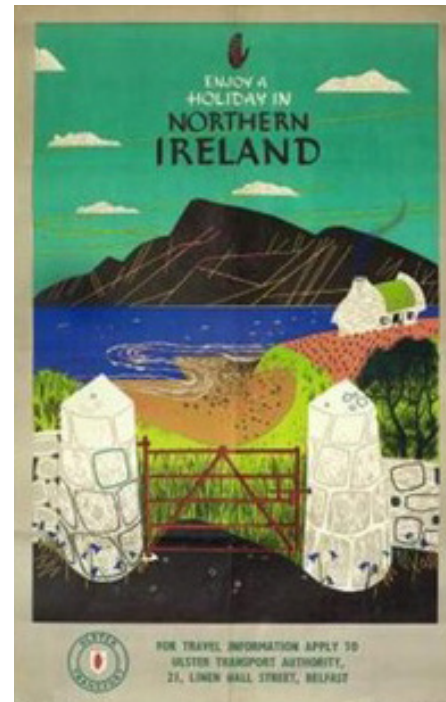
Irish Tourism of Yesteryear

Figure 1

2020 forecast – international tourist arrivals (million)
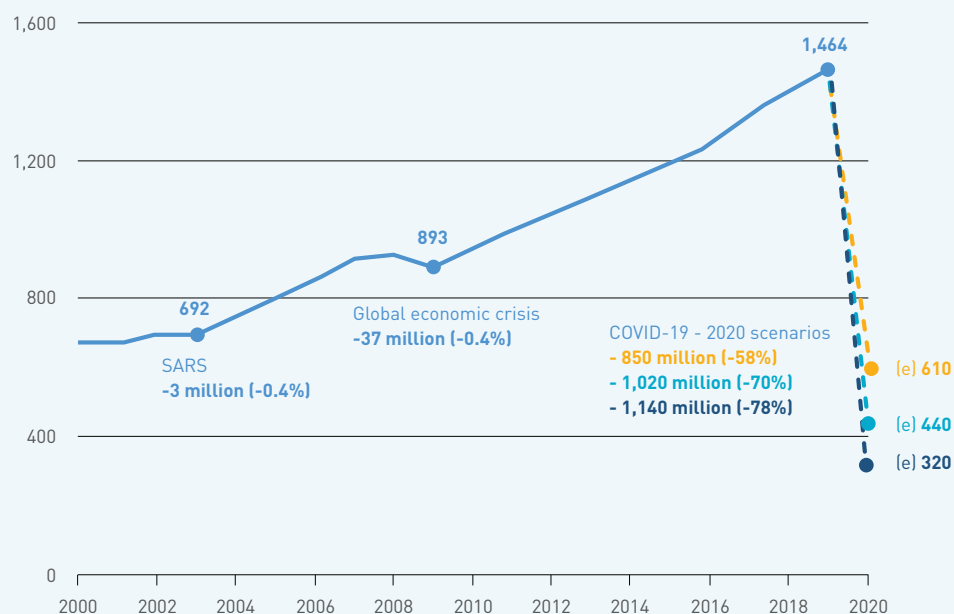
Source: UNWTO
The above are not forecasts. They are scenarios based on the possible opening of national borders and lifting of travel restrictions in July, Sept. and Dec 2020 respectively

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42   https://www.tourismireland.com/Research/Overseas-Tourism-and-Tourism-Ireland-Key-Facts
43   https://www.unwto.org/un-tourism-news-12

Stage 2 – A Return to (New) Normal

While restrictions will gradually subside as the infection rates falls, they cannot be removed altogether in the absence of treatments or a vaccine. Fresh occurrences, such as those afflicting South Korea in late May, are always possible.

No one is in a position to say with any certainty how the next two or three years will evolve but there appears to be a broad consensus that it is not going to be an easy ride.

The economic impact of the crisis is dire, commentators reach for ever more colourful epithets in an attempt to capture the enormity of a problem that has materialised, as it were, out of the blue.

The **International Monetary Fund** is predicting a loss in global output of 3% in the coming year – this may be compared with a drop of 1% in the aftermath of the 2008/09 recession.[44]

The **International Labour Organisation** has warned that 1.6 billion workers or half the global workforce "stand in immediate danger of having their livelihoods destroyed" due to the downturn.[45] All of these are in the so-called "informal" or "gig" economy and are the most vulnerable in the labour market.

These forecasts represent a truly dire short-term future and are without precedent in living memory.

The **EU Commission** using "benign assumptions" expects the Union economy to contract by 8% this year and to "rebound" by 6% in 2021. This would leave the combined GDP of the EU some 5% below where it would otherwise have been.[46]

Closer to home the **Economic and Social Research Institute** (ESRI) – the Republic's leading economic think tank – claimed on 28 May that the "Irish economy faces its largest recession in history".[47] The views of the **Central Bank** were given in the Introduction.

The **Irish Fiscal Advisory Council** believes "the Covid-19 crisis will result in a deep economic downturn in the first half of 2020, with a lasting effect. With uncertainty exceptionally high....it could take 2 to 3½ years to return to pre-crisis levels of activity" – depending on the severity of the downturn (see graphs). By contrast, the Irish economy took 11 years to recover after the financial crisis.[48]

44   https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020
45   https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_743146.pdf
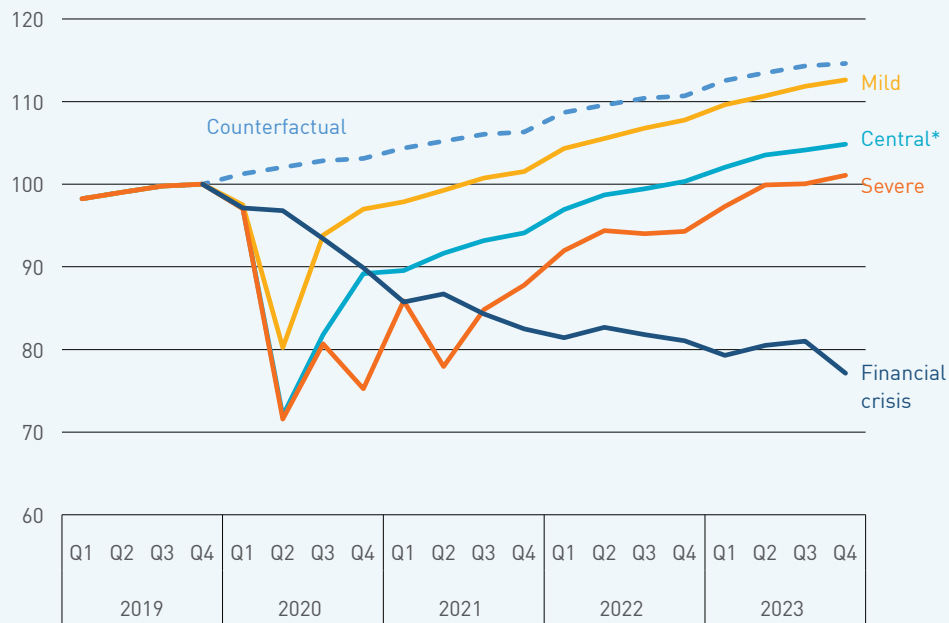46   European Economic Forecast Spring 2020, Institutional Paper 125, European Commission, May 2020
47   ESRI, Summer Quarterly Economic Commentary, May 2020
48   https://www.fiscalcouncil.ie/fiscal-assessment-report-may-2020-2/

Figure 2

Economic scenarios for Covid-19 vary widely. Underlying domestic demand (Index: Q4 2019 = 100)

*Sources: CSO; Department of Finance; and Fiscal Council workings. Note: * The Central forecasts are a replica of the official Department of Finance projections published in SPU 2020 (see Box D). The 2008 Financial crisis is indexed to Q1 2008. The "Counterfactual" is based on the pre-Covid-19 path for the economy.*

Irish Fiscal Advisory Council Forecasts to 2025

During the initial Stage 1 period discussed above an opportunity exists to consider the future and plan for the recasting of our society so that it can better address the scars left by the Covid pandemic as well as longer term problems. During this time the world will fashion a "new" or "next" normal and there will be a permanent schism between the pre- and post-Covid worlds. It goes without saying that it behoves the world's leaders to make the right decisions as we will have to live with the consequences for some time to come.

As has been discussed the big-ticket items waiting to be tackled in this new normal world include achieving the goals of the Paris Climate accord and implementing the EU Green Deal. These must be addressed while managing the burden of debt accumulated in safeguarding the population and neutralising the initial shock of the crisis in the Stage 1 when the economy was placed on financial life support as well as the funds deployed in Stage 2 to re-launch the economy and provide stimulus into the future.

It is possible to sketch a vision of the kind of "climate-neutral, resource-efficient, competitive economy" envisaged by the EU in its Circular Economy policy document. It summary it should provide a sufficiency of well-paid jobs and a high quality of life to an educated and diverse workforce.

Achieving this goal will require skilful navigation of the many treacherous shoals that will face leaders over the next 3-5 years; it will require high levels of understanding, commitment and 'buy in' by the public and strong, focussed and principled political leadership. Many elements of precisely this kind have been engendered by the Covid-19 crisis.

Commentators speculate about the form the economic upturn, financed by appropriate monetary and fiscal policies, might take. Possibilities include a U-shaped upturn, with a rapid downturn followed by an extended recession/depression and then an equally rapid rapid upturn. More optimistically this process may assume a V-shape where the rapid decline is followed relatively quickly by a sharp rebound. Or, more pessimistically, it may be W-shaped (with a recurrence of the virus) or an L-shaped response where there is no rebound, but the economy remains in long-term decline.

The Irish Fiscal Advisory Council's expectations (see graphs above) are for a V-shaped recovery unless there is a recurrence of the infection in which case it is likely to be a W (or worse). Overall, the EU Commission is expecting a gradual but uneven "U-shaped" recovery.

If there is no recurrence of the virus – a big "if" - the Academy believes it is unlikely to be any single one of the L, U, or V models, but more likely a mix of all across the different sectors of the economy and indeed different regions reflecting the different experiences that individual sectors have had. Hospitality, travel and clothing have all suffered terribly while food retail and consumer goods have not fared so badly.

The challenge facing Governments and administrations is to discriminate across the different sectors and regions, allocating stimulus funding optimally, while avoiding a 'one size fits all' approach. Decisions of this nature are extremely difficult for the political system: they must be evidence-based and communicated clearly and honestly to the wider polity to gain acceptance.

The speed and effectiveness of the recovery will be dependent on the healthcare system's ability to detect and manage new cases through testing, isolation, and treatment. This may likely require technology-based monitoring and reporting systems. The deployment of such systems raises sensitive issues relating to data privacy.

Bearing in mind the rapidity with which the Irish economy recovered from the financial crisis, the strength of that recovery, taking into account the determination of Irish and EU leaders in the face of the present challenge and the scale of the stimulus funding being deployed, it is not unreasonable to conclude that the recovery from the Covid-19 crisis may be closer to a V-shape than any other.

As **former Irish President Mary Robinson** recently noted "Governments need to put huge amounts of money into trying to sustain jobs and livelihoods...but they must do it with a very strong green emphasis. The threat from climate change is as real as the threat from Covid-19, though it seems far away." The Academy echoes those sentiments.

Recommendation 7

The Academy recommends economic recovery programmes should be designed so as to achieve the key, longer-term, strategic environmental objective of a decarbonised, circular economy.

"Governments need to put huge amounts of money into trying to sustain jobs and livelihoods...**but they must do it with a very strong green emphasis.**"

10 Conclusions and Recommendations

Conclusions

1. The Covid-19 pandemic has wrought unprecedented disruption in the social and economic life of many countries across the globe. In Ireland there has been wholesale closure of businesses, the possibly permanent loss of hundreds of thousands of jobs and a huge increase in national indebtedness.

2. This disruption has been accompanied by an equally unprecedented level of State involvement and control in all aspects of the citizen's life – with their general acquiescence in the interests of the public good.

3. The disruption has necessitated the deployment of massive sums of emergency State funding, to maintain whole sectors of the economy on 'life support'.

4. Further additional expenditure on a huge scale is anticipated to reboot and revive the economy when the acute phase of the crisis eases sufficiently.

5. All or most of this additional State expenditure will have to be borrowed – from European institutions or other international funds. There may be a modest element of grant aid from these sources.

6. Borrowing of substantial sums may be sustainable if interest rates are low and the repayment period is exceptionally long.

7. On balance, although the shock to the economic life of the country has been an unusually sharp one, recovery may also be surprisingly rapid.

8. Thus, a 'once-in-a-lifetime' social and economic upheaval is upon us. The question is then: "can the crisis be put to good use?" Can society be democratically re-modelled by employing the community solidarity that the crisis has engendered, so that it is put on a more environmentally sustainable path?

9. Major structural changes are needed to achieve such an outcome. In normal times this would be politically difficult if not impossible to achieve. The immediate post-Covid period may provide a window of opportunity unlikely to be repeated when the necessary changes may be initiated.

10. The change to a more sustainable economy must be achieved in a manner that is respectful of Just Transition principles.

11. The implications of the crisis and its aftermath for specific sectors of the economy will be assessed by the Academy in a series of briefing papers being prepared and to be issued in the coming weeks. The areas being assessed will include many of those targeted for support in the EU's Green Deal and include:

    o   Infrastructure
    o   Renewable Energy
    o   the Circular Economy
    o   Cleaner Transport
    o   Digital connectivity.

Recommendations

The Academy makes the following recommendations to government:

1. The Academy recommends that public policy should be fully aligned with any trend away from exclusive reliance on the static office working environment and provide whatever supports are needed to encourage and reinforce the emergent "no commute" culture. This will have implications across a range of areas including land use planning, balanced regional development, home design, public transport, personal taxation, and access to broadband.

2. Government, in imagining and developing policies to deal with the immediate aftermath of the crisis and the rejuvenation of the economy, should ensure such policies can also promote a "greener" future.

3. Ireland, as part of its embrace of sustainability, should support the renewed and strengthened EU Biodiversity Strategy as part of the Green Deal and ensure its implementation in Ireland.

4. The ambitious agenda of the circular economy and the associated technological revolution should be promoted as part of a progressive and successful greening of the economy in both jurisdictions on the island.

5. Ireland should be clear and strong in its support for the EU Green Deal and oppose any attempt at EU level to abandon or unwind hard won progress in other areas of the environmental agenda, including the Emissions Trading System.

6. The most practical way to build consensus, avoid undesirable social and economic outcomes and achieve the goal of a sustainable, decarbonised economy is by re-tasking the Citizen's Assembly with proposing the most equitable way of transitioning to a decarbonised, sustainable economy with key milestones in 2030, 2040 and 2050.

7. Economic recovery programmes should be designed to achieve the key, longer-term, strategic environmental objective of a decarbonised, circular economy.

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THOUGHT LEADERSHIP IN A TIME OF GREAT CHANGE