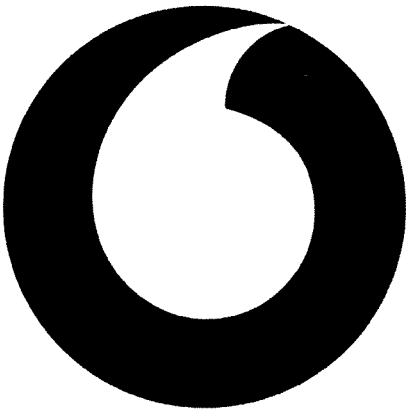

Vodafone Ireland Submission to the Department of the Environment, Climate & Communications

Call for Expert Evidence
Climate Action Plan 2023

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Introduction

Vodafone Ireland welcome the opportunity to respond to the Department's Call for Expert Evidence on the Climate Action Plan 2023. We remain at your disposal should you want to discuss any of the information contained within our response, in more detail.

The interaction of the green and digital transitions is critical for modernising the economy and key to ensuring the sectoral emissions targets are met. Urgent and sustained action is required to address the climate emergency, and we see a significant role for digital networks and technologies in helping to address climate change. Digitalisation is key to saving energy, using natural resources more efficiently and creating a circular economy.

Digital tools can also contribute to the social fairness of the green transition by helping individuals and small businesses to adapt quickly to the deep structural changes of the coming years. Innovation in digital tools supports sustainable job creation, the resilience of SMEs and the transition to circular business models. This is why the interaction of the green and digital transitions is critical for modernising the economy.

To enable these digital technologies, however, is the requirement for 'always on' telecommunications which ensures uninterrupted connectivity around the clock. This uninterrupted connectivity is a key requirement for the government's sustainability agenda whereby things like smart meters, smart grid tools and in-home apps require high-speed technology to operate as planned.

As a significant energy user, the impact of energy security, supply on the economy as a whole, and in particular the significant increase in energy costs is a cause for real concern. As a business, and as part of our sustainability agenda, we continue to invest in energy efficiency, managing to keep our energy consumption almost flat while delivering a >1,000% increase in network traffic over the past 5 years, however we are still facing a substantial increase in our energy costs this year, with recent proposals from the CRU to introduce time-of-use tariffs set to negatively impact us further, given our inability to reduce usage given the 'always on' nature of our networks, which customers rely on. The current environment is a challenging one for our industry, in balancing long-term investment in capital deployment and short-term energy costs.

We are keen to work with and understand Government plans to support critical industries such as our own to ensure investment continues at pace, alongside supporting SMEs, families, and communities across the country to decarbonise.

Ireland must create the investment environment to accelerate the transition to renewable sources of energy in the mid-term and in the long-term, set the roadmap for energy self-sufficiency with major capital investments in low carbon generation (e.g., wind, solar, hydrogen, nuclear).

We believe that with the right combination of incentive, technology and partnership, the EU can accelerate the transition to a fossil free future and reach its sectoral emissions targets, while dramatically improving energy security and self-sufficiency.

Vodafone Ireland

For the purpose of the consultation, we confirm that Vodafone is a business; and is Ireland's leading total communications provider with 2.3 million customers and employs over 2,000 people directly and indirectly in Ireland. Vodafone provides a total range of communications solutions including voice, messaging, data, and fixed communications to consumers and to small, medium, and large businesses. Since 2011, Vodafone has expanded its enterprise division, offering integrated next-generation fixed and mobile solutions in addition to cloud-based platforms, machine-to-machine services, and professional ICT support.

For our own part, our entire Irish operations are 100pc powered by electricity from renewable sources. That means our mobile and fixed networks, our data centres, our retail outlets and our offices are all powered by green energy. Together, that's equivalent to the annual energy use of 27,000 Irish homes. And we have achieved this by our revised target of mid-2021, having originally planned to do this by 2025.

We're also focusing on building a circular economy at Vodafone – for example, all the network equipment in Ireland is recycled or reused by another market, as part of an extensive effort across Europe to repurpose excess or decommissioned stock. We are also reusing, reselling or recycling 98.7pc of our network waste in Europe and that will be 100pc by 2025. Earlier this year, we became the first telecommunication company in Ireland to offer an online trade-in service, with customers able to get up to €400 for a smartphone.

In parallel to our net-zero ambitions, Vodafone aims to use the network, technologies and services and products it offers to consumers and customers can support them in achieving their own ESG ambitions, which we have illustrated in more detail throughout the submission. Vodafone's aims to support its customers to reduce their emissions by 350 megatonnes between 2020 and 2030.

Questions

1. *What do you view as the key actions required to ensure the emission reduction targets set out in the Sectoral Emission Ceilings are met?*

The interaction of the green and digital transitions is critical for modernising the economy and key to ensuring the sectoral emissions targets are met. Urgent and sustained action is required to address the climate emergency, and we see a significant role for digital networks and technologies in helping to address climate change. Digitalisation is key to saving energy, using natural resources more efficiently and creating a circular economy.

Digital tools can also contribute to the social fairness of the green transition by helping individuals and businesses to adapt quickly to the structural changes of the coming years. Innovation in digital tools supports job creation, the resilience of SMEs and the transition to circular business models. This is why the interaction of the green and digital transitions is critical for relaunching and modernising the economy.

With this in mind, we feel it hugely important to raise concerns we have under the broader umbrella of the National Energy Security Framework. In particular, this relates to the fact that telecommunications operators are not deemed a 'priority' under the ESBN's DSO Operator Load Shedding Plan, meaning that in the event of energy rationing, we will not be exempt from electricity disconnection.

As outlined above, as Ireland moves to a cleaner energy future, many of the technological requirements depend on reliable telecommunications infrastructure and connectivity. The Government and the CRU have indicated that they will rely heavily on smart infrastructure to not only manage the security of supply issues, but also the move to a cleaner energy future, all which rely on our networks.

To enable this transformation to smart technology is the requirement for 'always on' telecommunications which ensures uninterrupted connectivity around the clock. As the industry that not only supports this crucial existing infrastructure, but importantly, the industry that will be required to invest heavily in its infrastructure to meet the future needs of society, and to support the State's climate ambitions, it is imperative that telecommunications have a guaranteed supply of electricity, as far as is practically possible.

2. *What do you view as the main challenges/obstacles to the Sectoral Emission Ceilings being met?*

Given the importance of digital tools and technology for homes, businesses, and communities to save energy, use natural resources more efficiently and create a circular economy, the concerns around security of electricity supply and energy pricing will undoubtedly have knock on impacts on climate ambitions.

Considering Vodafone itself, having assessed our own energy costs for the operation of our business, they are projected to see material increase over the coming period. To place this in context, this is a sector which is already suffering from depressed returns, but which is expected to develop much of the technologies and infrastructure required for a cleaner future. In our view, it makes the need to act in partnership to address energy cost issues impacting both the business sector and consumers, ever more critical. We welcome recent announcements by the European Commission to protect businesses impacted by high energy costs and would push for supports to be available to businesses of all sizes.

While the risks to businesses of different sizes differ as a result of the rise in energy prices, it is important that there is an understanding that the significance of the rise in energy prices will have an impact on investment decisions over the coming years, investments which the clean energy future relies on, in the absence of support.

In terms of further investment barriers which may serve as obstacles to the emission targets being met, the latest CRU Time-of-Use tariff proposal which seeks to reduce energy usage at peak times of the day may disproportionately impact industries who cannot reduce their usage.

As per the Department's most recent Statement of Strategy, digital technologies provide huge opportunities "to achieve sustainable solutions and energy efficiency." To enable these technologies, however, is the requirement for 'always on' telecommunications which ensures uninterrupted connectivity around the clock. This uninterrupted connectivity means we cannot reduce our usage, but it is this uninterrupted connectivity which plays a key role in the government's sustainability agenda whereby things like the aforementioned smart meters, smart grid tools and in-home apps require high-speed technology to operate as planned.

Instead, Ireland must create the investment environment to accelerate the transition to renewable sources of energy in the mid-term and in the long-term, set the roadmap for energy self-sufficiency with major capital investments in low carbon generation (e.g., wind, solar, hydrogen, nuclear).

We believe that with the right combination of incentive, technology and partnership, the EU can accelerate the transition to a fossil free future and reach its sectoral emissions targets, while dramatically improving energy security and self-sufficiency.

We call on Governments to take action in three key areas:

1. Partner with industry to accelerate the roll out of energy efficient solutions, such as solar, wind, peak shaving initiatives, etc., across the energy ecosystem.
2. Prioritise digital technologies, enabled by connectivity and data analytics to deliver energy savings. Connecting to create transparent ecosystems creates the step change required to tackle the climate crisis by unlocking the potential of AI, automation, IoT and other technologies. These technologies will enable the shift to a green economy that is circular by design, focused on regenerative approaches to maximises productivity and efficiency across the ecosystem.
3. Accelerate the distribution of EU recovery funding for the green transition, in order to achieve self-sufficiency and energy security and incentive investment through the right taxation structure.

Carbon Pricing and Cost-Cutting Issues

3. *Are there any unintended barriers within the planning system that should be addressed at national policy level in order to deliver our climate ambitions?*

The telecoms industry is seeking to upgrade capacity and expand their networks, as they integrate 5G technologies, which will play a key role in the decarbonisation of the Irish economy in the short and long-term. The upgrade of the networks will require changes to infrastructural design and equipment types in order to deliver these transformative services.

To do this effectively requires both state and industry actions to remove inhibitors to the successful rollout of new technologies and help promote greater long-term investment in infrastructure. Central to this goal is the planning process which, in conjunction with the Commission for Communications Regulation (ComReg) and the service providers, determines the quality and quantity of Ireland's telecommunications network.

In terms of the current Planning Act, which we understand is being reviewed, we would point to the following:

- There is a deficit, in that the planning guidelines need to reflect changes and recommendations in policy at a European level, particularly with regard to digital ambitions
- Legislation and guidelines must have adaptability to reflect changes in technology in terms of infrastructure required, as well as equipment.
- Remove controls around the restrictive conditions preventing use of exempted development
- Remove exclusion zones around public centres and amenities
- Development contributions should be waived if the mast is part of the designated scheme to address rural mobile coverage
- Development Contribution Guidelines issued in January 2013 – exempting telecommunications infrastructure from development contributions need to be adopted and consistently applied by all local authorities (currently adopted by 27 of 31 authorities). This will immediately free up capital, enabling further investment in infrastructure.
- Consideration to be given to amendment measures allowing telecoms infrastructure to be included in the criteria for access to the Strategic Development planning procedure – with planning application lodged directly with An Bord Pleanála, if for example there were a significant number or volume of applications to be submitted to one local authority as part of network coverage or upgrading programme.

While not directly a planning specific issue, it's also important to point out at this juncture that a real gap remains in providing connectivity services to certain blackspot areas around Ireland, which will mean some customers in those areas will be locked out from the decarbonisation opportunities provided by an increasingly connected society.

Now is the time to explore the opportunity for state and industry collaboration to address this issue and assist in further balanced regional and economic development. Shared Rural Network can play a role here. The provision of critical 4G and 5G coverage will enhance the operation of rural economies and societal supports ensuring key activities such as farming, medical services, rural elderly support schemes and SME business operations can remain connected while travelling in rural areas.

A critical element in allowing for the development of network extension, and crucially the necessary investment case for its development, is the need for local authorities to share sites under their ownership for this type of development. All local authorities should be mandated to work with operators to support access to sites and to provide appropriate infrastructure which will assist the business case for network development in poorly serviced areas of Ireland.

Given the investment case has been hard to make for development on rural sites in the past, the provision of these lands without cost by local authorities, state agencies or Government bodies would further boost the case for investment.

Electricity

4. What other opportunities exist to support the decarbonisation of the electricity sector?

Ireland's electricity grid has traditionally been very reliable and can deal with normal fluctuations in electricity use. However, the path to decarbonisation presents new challenges in electricity control, and central to any energy strategy is the need to connect and create the smart grid. As energy systems become

more distributed, sources of supply more variable (e.g., sun/wind) and demand increases, greater control is needed to balance supply and demand.

The smart grid gives utilities the means to meet these challenges - remote data management and monitoring capabilities, automation and control, and the systems for the effective utilisation and safe management of transmission and distribution networks. The smart grid not only enables utilities to deliver electricity in a sustainable, economic, efficient, and secure way, but it also opens up opportunities for the development of other new low carbon technologies such as the smart home and digital cities.

The EU has led the way with smart metering, and we welcome the progress made in Ireland to roll these out with roughly 750,000 completed to date. By 2022, Vodafone connected over 20 million smart meters, grid control and renewable generation assets, saving c.1.6m tonnes of CO^2e.

We see this trajectory continuing with a clear focus across Europe by Member States, through their national recovery plans, energy management systems for buildings that reduce energy loses and wastage, smart cities, and water management solutions.

With the right combination of incentive, technology and partnership, the EU can accelerate the transition to a fossil free future, dramatically improve energy security and self-sufficiency and capture the value of green technology development.

Enterprise

5. *What other opportunities exist to drive the decarbonisation of the enterprise sector?*

Achieving a fair and sustainable transition to a climate neutral society by 2050 will require action and investment in digital solutions across multiple sectors, but in particular the enterprise sector. Digital solutions and connectivity are critical enablers of the technologies that enable greater sustainability within smart ecosystems. Connectivity underpins use cases throughout the value chain, from smart agriculture to smart logistics, smart cities, and smart energy.

These use cases leverage technology solutions such as IoT, machine learning, artificial intelligence, and Big Data to develop and commercialise new, more sustainable applications. However, these technologies will all require fast, secure, and reliable connectivity to gather and process data, making 5G deployment a key driver of successful adoption of these new applications.

- Smart energy meters enable businesses to monitor and reduce their energy use, lowering energy bills and the environmental impact of energy production. Worldwide, Vodafone's IoT platforms have connected over 12 million smart meters, saving c.1.6 million tonnes of CO2e last year.
- Smart manufacturing enables factories to be more efficient, reduce wastage and have a lower environmental impact through emissions and pollution reduction. Connected machinery can be continuously monitored to reduce maintenance and downtime, as well as allowing remote monitoring to reduce engineer callouts. NB-IoT networks also enable low-power sensors to reduce energy consumption.
- Smart logistics embeds IoT technologies in vehicles to optimise route management, vehicle maintenance and driver behaviour. Vodafone's IoT vehicle solutions are able to deliver cuts in fuel consumption of up to 30%, saving an estimated 4.8 million tonnes of CO2e last year.
- Smart agriculture enables farmers to manage their crops and livestock more efficiently and sustainably through connected monitoring devices and farming equipment. Reductions in raw materials requirements of up to 20% have led to reduced damage to local environments and habitats through lower natural resource consumption and fertiliser use.

The world has known about the need to take action to tackle climate change for a long time. The challenge now is in the execution. It will require strong partnerships between Governments, industry, and citizens. Connectivity providers will play a key role in connecting value chains and being a part of these partnerships.

Digital applications will empower businesses to effect change within value chains and enable ecosystems to be sustainable and adaptable. Data will be central to ensuring a consistent evidence base for decision-making and measuring the impact, requiring IoT technologies and connectivity.

6. *Are there measures that can be taken to assist businesses sustain the additional operating costs associated with moving to new, low-carbon technology?*

According to research we conducted with Irish SMEs in 2021[1], while Irish SMEs have identified a significant need to invest in digital tools and technology to support business growth and future proof their businesses in recovery, consensus is indeed that the cost of investment in technology is a significant barrier, compounded by a lack of access to capital to support them in their digital transformation.

Other barriers such as the availability of suppliers in the marketplace and the ability to upgrade outdated systems are discouraging SMEs from engaging in digital transformation.

That said, SMEs are largely optimistic about their business when they look to the future, and overall, appear to be more certain in relation to economic policy than other Europeans.

With this willingness to invest and a positive business outlook, there are significant opportunities for Irish SMEs to view the pandemic as a catalyst to embrace digitalisation and compete with other EU markets.

With this in mind, government should intensify SME support for further digital adoption, innovation, and entrepreneurship through different vouchers reflecting adoption challenges specific to SMEs:

1. **Availability** of the technologies required for digitalisation, namely high-speed connectivity and suitable digital tools and services.
    - Connectivity vouchers offer financial support for high-speed internet access, complemented by support for the purchase of digital devices where needed.
2. **Capacity** of SMEs to engage with digital transformations, in the form of financial and time capacity.
    - Innovation vouchers for digital tools and services, with funding for communication and collaboration tools, security services and solutions, cloud migration and software, and IOT.
    - E-commerce vouchers support SMEs to trade online, boost sales and reach new markets.
3. **Capability** of SMEs to gauge, plan, and implement their digital transformations through digital skills.
    - Digital skills vouchers support SMEs in upskilling on key digital skills.

Case Study: Spain

Vodafone has deployed our experience of working with SMEs, working closely with the Spanish Government to co-create a Digital Toolkit for SMEs, which has involved:

- Close collaboration and co-creation between Government, Vodafone, and SMEs, to ensure that the programme is fit for purpose, acting as a bridge between the Govt and Vodafone's large SME customer base, to provide feedback on the content and structure to ensure it is achievable and fit for purpose.
- To ensure efficient take-up, we are working on a range of solutions, including digital marketing; e-commerce; cyber-security; digital business solutions and smart working. Vodafone is working with our top-tier technology and finance partners, allowing us to act as a one-stop-shop for SMEs.
- We have been using our extensive communication channels to raise awareness with SMEs of the Digital Toolkit and how they can take advantage of the programme; and developing tools to help

[1] Covid-19 and The Irish SME Sector: Supporting Recovery and Growth - LINK

SMEs assess their current digital maturity status and provide recommendations on how they can improve this.

- Vodafone has advocated using as simple a method as possible to distribute the funds. To achieve this, we have worked with the Govt on developing a voucher scheme, covering up to 90% of the SME's costs. The intention is for the Govt to pay this 90% directly to the supplier, rather than through the SME, reducing complexity and time for the SME. This is important for businesses with a more limited cashflow, who need upfront access to financial support for digitisation, in comparison to complex tax reliefs.

Spain's approach and political will to overcome the digital gap faced by SMEs is a positive example, and a strong way to deliver for SMEs. From our perspective it doesn't matter who is involved in the process, but that it provides the results and what is needed for SMEs.

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Aside from SMEs, from our own perspective as a large business and as outlined above, Ireland must create the investment environment to accelerate the transition to renewable sources of energy in the mid-term and in the long-term, set the roadmap for energy self-sufficiency with major capital investments in low carbon generation (e.g., wind, solar, hydrogen, nuclear).

Governments should seek to partner with industry to accelerate the roll out of energy efficient solutions, such as solar, wind, peak shaving initiatives, etc., across the energy ecosystem; prioritise digital technologies, enabled by connectivity and data analytics to deliver energy savings; and accelerate the distribution of EU recovery funding for the green transition, in order to achieve self-sufficiency and energy security and incentive investment through the right taxation structure.

Transport

7. *What potential do blended working policies or remote working hubs have to help reduce commuting travel and volume of transport emissions?*

We know the pressures as a society on transport and commuting times, but also on things like house process and childminding, so there is a clear benefit to a more flexible working policy. For its own part, Vodafone introduced a hybrid model in 2021, as we saw a once in a generation opportunity to lock in some material benefits for society and people in terms of work-life balance. From consultation with our people, we introduced a 60-40 split, where people will spend 40% of their time in the office and 60% either home or remote working.

Blended working policies have been supported by Vodafone long before this, however, as in 2017, Vodafone and SIRO launched the Gigabit Hub Initiative, providing free 1 Gigabit broadband connectivity to digital hubs, community centres and co-working facilities around the country. The objective was to spark a digital enabled transformation across Irish towns, and in the process, support the creation of jobs, bringing life back to rural towns across Ireland.

To enable these blended and remote working policies, however, is the requirement for high-speed connectivity around the country. Gigabit connectivity is fundamental to enabling smart working. It is playing a transformative role in businesses and the lives of many employees as it becomes available in more locations, not just our major urban centres. In creating opportunities for local business development – this connectivity can support the migration of high-value businesses and jobs to any location in Ireland. It can act as an economic stimulus for regional towns and villages while relieving pressure on urban areas in the short-term.

8. *What potential do digitalization, innovation, and efficiency improvements in the commercial sector (including, e.g., establishing logistics hubs) have to deliver emissions abatement? What are the barriers to delivery of each?*

Logistics businesses are always looking to speed delivery and reduce costs. With connectivity solutions like IoT, ports can speed movement of containers, items can be tracked and monitored. Trucks and lorry fleets can be better managed, and operators and drivers better connected.

By way of an example of what is possible, we recently launched a 'Smart Container' freight logistics solution with Kerry-based technology company, Net Feasa, called IoTPASS, transforming the intermodal freight container, one which is used across different modes of transport without being unloaded, into a Smart Container.

Using Vodafone's global IoT network, the solution now tracks the container rather than the truck, ship or train and provides a single unified data set that is consistent wherever the container is on its journey across the supply chain. As a result, the solution will enable transportation and logistics companies to make extensive cost savings and carbon footprint reductions through the analysis of valuable real-time data, detailing where the container is at all times - whether on land, in the sea or in the air. The solution offers true visibility and true traceability across the supply chain.

Ireland has committed to net zero greenhouse gas emissions by 2050, with a 51% reduction by 2030. Meeting these targets and enabling efficiencies like IoTPASS, while striving for an economically robust and inclusive society, will rely on continued technological advances. But in many cases, both private and public investment in infrastructure is not yet at the level necessary to drive these changes.

By integrating information and communication technology (ICT), as well as various physical devices connected to the IoT (Internet of Things) network, smart solutions allow economies to build back better in a way that also ensures the green transition that is required.

Agriculture

9. *What are the opportunities to increase take-up of measures identified in AgClimatise and encourage adoption of other practices which reduce emissions?*

Ireland has a reputation for producing safe, high-quality food and drink, and we need to safeguard that reputation by improving sustainability in all its forms. By digitising farming and bringing technology into the agriculture sector, we can empower farmers to increase production sustainability and improve their competitiveness, while also reducing their environmental impact.

Digitisation can help agri-businesses to achieve the objectives of sustainable and secure food systems. However, in order to get there, we need to jointly work on overcoming existing barriers:

- Lack of availability of necessary technologies to digitalise (connectivity in rural areas) and suitable easy to use digital tools and services
- Lack of capacity in terms of equitable financial resources for farmers to participate in the digital transform yielding a benefit to all food value chain stakeholders
- Therefore, we call for breaking the siloes between Agri and digital sectors – just like France did with la French Agri tech
- Build infrastructure, digital know-how and skills and digital partnerships

10. *What measures would support increased sustainable management of grasslands, including those areas on drained organic soils?*

Digital farming represents a unique opportunity to create value and business opportunities by applying data-driven solutions. Through connectivity and digital technology, this helps to improve resource efficiency,

productivity, environmental processes, animal health and welfare, while also mitigating against climate change.

To support the increased sustainable management of farmlands, IoT solutions such as our very own cloud-based web platform MyFarmWeb, support farmers and agricultural businesses with best practice decision making. It helps enable farmers to produce the most profitable yield available from the land and environment under their control. Features of the platform include:

- Conduct soil physical, chemical, and microbial analysis
- Detect and monitor pest presence
- Receive satellite and remote sensing information
- Gather data from IoT sensors like soil moisture probes, vehicle trackers and weather stations
- Schedule irrigation systems

Commercial farms rely on precise agricultural practices to run their businesses effectively. These practices are dependent on multiple sources of data and information stored in different places. This makes it harder to make consolidated and informed decisions.

IoT technology offers farmers and agricultural businesses a digital solution to this challenge, introducing precise and autonomous sensors to farms to support data collection.

Platforms like MyFarmWeb enable the consolidation of various data streams over time, supporting data analysis through a single dashboard that is easy to manage.

11. *What specific measures can be taken in agriculture, forestry, and land use to adapt to climate change?*

If we look at forestry in particular, measuring tree growth enables scientists to estimate how trees absorb and store carbon from the atmosphere – but as forests tend to be located in remote areas, which limits research possibilities, there is an opportunity to use IoT technology to monitor those areas which are often inaccessible or too costly to reach.

Recently, we partnered with the Department for Environment, Food and Rural Affairs (Defra) and Forest Research, using technology to monitor the role trees play in tackling global warming.

Specialist sensors have been attached to trees in two forests in the UK and are connected via Vodafone's leading Narrowband-IoT (NB-IoT) network. Data is collected and transmitted to Defra and Forest Research, where advanced analytics assess the impact of temperature, humidity and soil moisture on tree growth and function. Projects like this have the potential to transform the way we are able to collect and analyse forestry data, which is critical to targeting efforts to measure the contribution of individual trees to climate change.

After an initial successful trial, a further expanded trial was recently announced, with the results expected to inform policy makers and the public of how the changing environment impacts tree growth and the huge benefits that trees can provide by storing carbon.

Briefly, in addition to this project, we also created the world's first "smart forest" in Romania in an effort to help tackle illegal deforestation in the country. As this crime often takes place in rural and remote areas, a huge challenge has been identifying where it is happening and intervening before it's too late. To help navigate this, Vodafone created IoT devices called "guardians" which, equipped with acoustic sensors, can pinpoint exactly where trees are being destroyed.

The guardians "listen" to the sounds from the forest and send the captured data to a cloud platform, where the AI recognises the specific sounds of logging. The system, which uses Vodafone Romania's Supernet network, sends real-time alerts with geolocation to an app installed on forest administrators' or rangers' phones, so they can intervene immediately. By protecting trees, we are helping the planet fight climate change.

By integrating information and communication technology (ICT), as well as various physical devices connected to the IoT (Internet of Things) network, smart solutions allow economies to build back better in a way that also ensures the green transition that is required.

All of these systems rely on technology such as IoT, machine learning, artificial intelligence, and Big Data to develop and commercialise new applications. These smart ecosystems all require fast, secure, and reliable connectivity to gather and process data, which makes 5G deployment a key driver of success in this area. Adding IoT, edge computing and the further application of Big Data solutions, these emerging technologies could be transformative

Waste and the Circular Economy

12. *What are the main barriers to consumers embracing the Circular Economy, e.g., lack of awareness, increased costs compared to disposable products, lack of access to circular goods and services?*

The opportunities that the circular economy presents are numerous and continuously evolving. For individuals, it offers a more sustainable lifestyle with reduced environmental impact and lower household bills. For businesses, it provides the chance to reduce costs, improve raw material supply chains and increased opportunities to diversify into new business models and markets, attracting a variety of new customers. For society, the circular economy presents huge employment and innovation opportunities that will be essential in the post-Covid-19 recovery.

If managed well, the transition to the circular economy will have multiple benefits for the labour market, including the opening of job opportunities, raising job standards, and reducing inequalities through a redistribution of value.

Awareness: These, however, must be underpinned by training and upskilling of the workforce through the integration of circularity into education and training programmes and engagement between government and enterprise to enable access to these programmes, good quality jobs, and an inclusive labour market that provides opportunities for people that are distant from or at risk of being phased out of the labour market.

It would be our view that awareness of the circular economy is low to medium amongst the Irish public, though there is a desire to understand more how consumer behaviour and responsibility can play a positive role.

Policymakers should help spread awareness and boost positive attitudes towards environmentally favourable practices by:

- Including environmental awareness education training within school curricula to educate young people.
- Launching public campaigns to drive environmental awareness across the wider public.
- Promoting schemes which encourage more environmentally friendly consumer decision-making e.g., Eco-Rating Labelling scheme.

Regulatory Barriers: While there is a clear business case within the Free Market already, there are also limitations that continue to incentivise a linear economy. These limitations include restricting access to second-hand materials and hiding the "true" cost of virgin raw materials. This is just the tip of the iceberg in terms of the barriers that must be overcome in order to grow the Circular Economy. In order to close this "circularity gap" though, we must deal with what are classified as tariff and non-tariff barriers.

Both tariff and non-tariff barriers are compounded by today's "global" nature of business. Because most products currently rely on a global supply chain, trade wars and their associated price instability impact both primary and secondary (waste) material markets. That impact can be massive in that it restricts supply chain mobility and distorts raw material prices. The impact ripples across the entire global materials market, which

includes waste materials that would be processed into the secondary raw materials that feed the Circular Economy.

Problem's processing waste into new secondary raw materials can lead to higher prices and lower quality. This then increases supply chain risk for companies who are looking for a steady and stable supply of high-quality raw materials. This risk, what the EU's Action Plan for the Circular Economy calls an "uptake of secondary resource" risk, leads to companies avoiding the use of secondary raw materials in their products which in turn brings us back to today's 9% circular world.

The Action Plan also highlights another key barrier, namely "design for reuse, repair and recycling". There are many examples of products, particularly consumer electronics, that are designed either to have a short (2-3 year) lifespan or to discourage repair (making it difficult to replace parts that commonly fail). Often these products quickly become obsolete, or when they break can be cheaper to replace than to repair. Designing products to have a longer life and to be repairable is one of the fundamental principles of the Circular Economy.

Regarding our own sector, there is a need for a more harmonised approach to regulation, this is critical to address the practical barriers to driving a circular economy agenda.

Consumer Behaviour: Consumer behaviour is another key barrier. For example, a 2018 study found that while most consumers were willing to buy second-hand goods, only 10% of Irish consumers had purchased anything second hand within the previous year. Preferences for second-hand goods varied by category, with consumers most likely to purchase second-hand clothing, and least likely to purchase second-hand appliances and electronics. For the Circular Economy to thrive, there must be strong consumer demand.

Vodafone: For our own part, Vodafone have committed to reusing, reselling, or recycling 100% of our redundant network equipment by 2025. In 2020 we launched a business-to-business asset marketplace solution within Vodafone that allows us to resell and repurpose large decommissioned electrical items like masts and antennae, helping us reduce carbon emissions. Over the next years, we plan to expand the scope of the asset marketplace. We are driving initiatives to reduce device e-waste, through trade-in offers, aftersales services to extend the lifecycle of devices and refurbished routers.

Earlier this year, we became the first telecommunication company in Ireland to offer an online trade-in service, with customers able to get up to €400 for a smartphone.

Vodafone also became the first operator in Ireland to introduce an Eco Rating, a labelling scheme for mobile phone devices, which we developed at Group level, together with Deutsche Telekom, Orange, Telefonica and Telia. This rating aims to help customers identify and compare the most sustainable mobile phones.

We are also joint founding members of Circular Electronics Partnership, an industry-wide alliance working closely with experts and global organisations to help drive the tech sector's transition to a circular economy.

Public Sector Leading by Example

13. What opportunities exist for the public sector to step up its climate ambition?

The strategic use of public procurement has been recognised as key to the global effort for sustainability, important enough to have a specific target within the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development, SDG target 12.7: "Promote public procurement practices that are sustainable, in accordance with national policies and priorities".

In the face of deep economic and social crisis resulting from the COVID-19 pandemic and at a time when governments need to conduct expansionary fiscal policies to limit or avoid economic recessions, Green Public Procurement and Sustainable Public Procurement must take its place in the range of fiscal instruments considered in the green recovery packages.

Even if efforts tend to focus first on developing resources for implementation to support practitioners to procure more sustainable solutions, monitoring and evaluating results should also be stablished at an early stage as it provides many benefits:

- At the management level, it helps to raise compliance by keeping each agency accountable and helps managers to improve implementation effectiveness by targeting support in identified areas for improvement.
- At the policy level, monitoring and reporting results demonstrate political commitment, enhances transparency, and reinforces the exemplary role of the administration, which encourages and legitimises the promotion of sustainable consumption by others.

In our own procurement policies at Vodafone, we have recently updated all requirements for vendors and contractors to ensure that a minimum of 10% of supply chain requirements and products are green or sustainably sourced, to encourage best practice and behavioural change.

Research and Innovation

14. *Are there important areas of research and innovation, where Ireland currently does not have sufficient capability, that need to be developed? If so, what are these areas?*

Given the exponential growth in the use of drone applications and the future importance of connected motorways it is essential that Ireland is positioned to engage in high value research and development on these emerging 5G enabled technologies.

With this in mind, we believe there is a need for subventions for 5G coverage for testing centres for applications such as autonomous vehicles and drones.