
From: Rachel Kavanagh <KAVANARA@tcd.ie>
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To: circulareconomy
Subject: Circular Economy submission on behalf of AICEG
Attachments: AICEG response to CE strategy.docx

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To whom it may concern,

Please see attached the Circular Economy submission on behalf of AICEG; if you require any further information please do contact me.

Kind regards
Rachel



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Response to ‘Ireland’s First Whole-of-Government Circular Economy Strategy Public Consultation on the Proposed Publication of the Strategy’

On behalf of The All Ireland Circular Economy Group

AICEG is a group of leading academics and industrialists across the island of Ireland that will promote the development of an all-island circular economy. Our objective is to create an environment for the island of Ireland to become a leader in the introduction and adoption of circular economy practices.

We are promoting a cross-border approach to ensure circularity is at the heart of policy and investment north and south of the border. We will develop quantitative assessments of need, identify economic opportunities, explore the research and development needed to exploit those opportunities in a collaborative research environment that can deliver success. The Group’s expertise spans social policy and innovation, legislation, business and economic strategy as well as scientific and technical focus on maintaining resource value through use cycles.

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Do you agree with the draft Strategy’s proposed key objectives? In your view, are there further or alternative objectives that should be included?

We broadly agree with these objectives. However, there are specific weaknesses in the objectives that are critical to the success of a strategy. This includes visible framing of a commitment to a fair transition and that any solutions should be proximal and within the island of Ireland and recognising an all-Island approach at the heart of any strategies.

The 5 proposed objectives are laudable in scope but deeper consideration must be paid to the reality, and scales, of challenges posed by the transition; this will require new instruments and institutions of governance, deeper and more embedded mission orientated research and translation through demonstration and knowledge exchange, assessment of how existing business models and value chains may be disrupted and a reorientation of societal consumption patterns and behaviour to mainstream the norms and values underpinning the circular economy. Each will be discussed using examples from across Europe, where we can critique existing best-practice from countries and current success stories where the transition is already underway.

A truly circular economy is a long-term ambition, given the complexity of existing supply chains, the changes in approach required by a range of players, and the as yet unknown technological and research developments that lie ahead. The challenge of how companies develop new business models around re-use, repair, leasing etc. cannot be underestimated. It is important to take steps now to set the direction of travel that will support the transition in meaningful ways to maintain societal buy-in, economic output and ensure that high-value jobs are created rather than lost to countries and regions already investing in the transition. We suggest that proposed circular economy plans are stress-tested through the application of techniques such as backcasting¹ to identify and overcome barriers to a successful transition.

We would suggest that objective 2 is reframed. The circularity gap index² has a very specific value with very specific inputs. It is somewhat crude and may not be the most appropriate measure across national economies. As a country with strong export markets, the measurement of our circularity gap is complex. We suggest that this objective be worded to something more useful such as “increasing Ireland’s circularity so that our performance not only meets but exceeds the EU national average by 2030”. We would stress this is highly ambitious given Ireland’s exceptionally poor performance across many of the internationally accepted measures.

A national policy framework as proposed in this consultation will be useful to create a consistency of approach, but on its own is unlikely to create and manage change. We suggest that specific missions be developed with key stakeholders, with well-defined medium and long-term targets and actions through the Circular Economy Programme. Mission-oriented policies that map to national and EU objectives should focus on creating system-wide transformation across many different sectors.

We would suggest that objective 3 is not strong enough. Raising awareness is not enough; we must move beyond this to set up structures that will help business and society adapt to circular processes. Companies and many members of the public are aware of the circular economy. The challenge isn’t

¹ <https://en.wikipedia.org/wiki/Backcasting>

² <https://www.circularity-gap.world/methodology>

about informing; it is about enabling society and business to implement circular practices to promote sustainable economic growth.

Mission-based approaches will necessitate new coalitions of stakeholders, including knowledge communities, with those in the business community and civil society/social enterprise. Good examples of this kind of broad governance approach can be found in the Netherlands' circular economy strategy. Taking a mission-based approach to the development and implementation of sectoral roadmaps, and the Circular Economy Programme, will enable the private sector to map their resource and supply chains, identify opportunities for future growth and engage with education and research communities to share knowledge, and help to secure and grow skilled employment in Ireland.

There are two important elements omitted that should be presented as clear objectives in an Irish strategy. Firstly, there must be an overriding commitment to a fair and just transition³. The circular economy is a deep and disruptive transition to an economic model that will affect everybody's lives. It must be implemented with due attention to its social impacts and we must ensure that this is fair, reduces social division and provides opportunities for all sectors of society. Secondly, we must take responsibility for our own solutions and those solutions must be proximal; we should not rely on neighbouring nations to recycle our waste or supply carbon credits. Instead, we must look to increase circular resource use and minimise waste production on our own island; ongoing research on the Island of Ireland is identifying the ways and means to operationalise this, keeping in mind that any solutions must be systemic in nature, innovations in technology must be able to operate at the relatively small scale, and success relies upon engagement of cross-sectoral networks of actors and institutions to truly effect change.

Do you agree with the overall level of ambition set out in the draft Strategy? If not, is further ambition needed or is the draft Strategy overly ambitious?

We recognise the aspirational nature of the strategy. However, it lacks specific elements that allow proper assessment of ambition. We welcome further engagement to contribute to action orientated plans.

It is hard to assess the ambition of the document beyond bringing our circularity gap to the EU average. To meet this objective specifically we need to achieve EU waste requirements with due recognition that our waste policy is firmly bound to waste export strategies which are difficult to quantify and do not provide an effective guarantee of the amount recycled. We suggest that Ireland needs to define our own benchmark, and to do so we need to begin with mapping where we currently stand and what we can achieve in the medium and long term. Under the proposed action within the Circular Economy Programme to "build knowledge and an evidence base to inform circular economy development in Ireland" there is an urgent need to set discrete and appropriate evidence gathering methodologies, goals and transparent monitoring metrics. This maps directly to proposed roadmaps, where we recognise that Ireland does not have the economy of scale in some

³ <https://www.chathamhouse.org/sites/default/files/2020-04-01-inclusive-circular-economy-schroder.pdf>

sectors; a reasonable way through is to identify and prioritise where we do have scale and then tackle more challenging sectors.

We welcome the proposal within the Circular Economy Programme to “Establish Ireland’s Reuse & Repair Sector”. Lack of investment has had a direct consequence here. If we are to maximise the expansion of job creation in this sector concrete policies and significant investment will be required, including research spend and infrastructural support, amongst others, to promote and create an equitable landscape for businesses. A major barrier to the circular economy for consumers is lightly to be cost; buying something new (e.g. washing machine, cooker) seems better value than getting an existing item repaired, or refurbished. Similarly, for the high value consumer goods sector measures which allow original equipment manufacturers and the aftermarket (remanufacturers) to coexist and remain profitable need to be implemented to ensure healthy competition while meeting environmental goals. Questions arise as to how these issues will be addressed.

Of particular interest will be the formulation of plastics roadmap, as EU policy bans all single use plastics by 2029. In Ireland, we have strong industry sectors relying on single-use plastics and questions arise as to how those businesses will adapt to change. We must define national targets and supports to address this and other critical issues if we are being truly ambitious. Firm legislation to require a certain amount of recycle in consumer plastics will increase the certainty of the targets and reflect our ambition in a more meaningful manner. Given that this is likely to be introduced within the next iteration of the Packaging Directive, it would be prudent to consider meaningful policy options to address this now. Similarly, due consideration is required to develop strong markets for secondary materials from recycle, given the limited availability of stable quantities and high quality of secondary materials. It is a critical issue for advancing the circular economy and without legislation, and appropriate translation of any forthcoming Directives, many of these ambitions will be challenging to implement.

Proposed schemes such as Extended Producer Responsibility are planned for expansion, we suggest that this scheme, and investment in demonstration projects, should strategically target projects of scale. These kinds of initiatives are critical to implementing circular practices and the lack of them will stall any attempt to deliver a true circular economy.

Should Ireland measure its progress in achieving a more circular economy relative to its European Union peers? If not, what alternative benchmark should Ireland adopt and why?

In general we disagree with a benchmarking exercise against EU peers. There are specific elements of the Irish economy which render this of little value. We should set targets that are designed to be meaningful for Ireland rather than providing figures palatable to EU defined standards.

It is not appropriate to assess our progress by benchmarking against other EU nations. This would not reflect the uniqueness of our economy and should not form a key objective in our national strategy. With a continued afforestation policy in Ireland, it could be argued that we should benchmark ourselves against the Nordic countries that perform well in circulatory measures. We also have industries that are less reliant on metal and alloys as base materials in contrast to other EU countries, making our recycling rates less easy to manage. It is also clear that many EU countries are disadvantaged compared to Ireland and should not be used as benchmarks.

If Eurostat's circularity rate measure is used as a means of benchmarking our progress in absolute, rather than comparative, terms as is currently phrased in objective 2, a number of crucial points must be recognised around the use of this benchmark.

1. European circularity leaders such as Sweden, The Netherlands, Denmark and Germany have begun the transition well in advance of Ireland. They have allocated significant public investment, instituted policy reforms and governance structures, and set ambitious targets to move beyond their current achievements to 2030 and 2050 timescales.

2. We must remember the population of each country with which we are comparing ourselves, as again, the economy of scale will hinder some pathways to success in Ireland. Similarly the method used to calculate and report on metrics, for example, single-use plastic recycling rates, differs across countries leading to an inability to compare fairly.

3. To expect that Ireland's circularity level will reach the EU average by 2030 may be counterproductive given our starting point. Irish society, industry, civil society, research community and public sector all need to align on the scale of the problem, but this must be realistic and achievable in 9 years to ensure buy-in and motivation. A more realistic goal may be to reduce Ireland's circularity gap in absolute terms by 2030, with the possibility of comparative benchmarking to reach the EU average by 2040, and exceeding this by 2050.

Similarly, it may be wise to focus on key missions with the most potential to develop circularity in the first instance, to advance projects of sufficient scale rather than a widespread but piecemeal approach. We recognise that it is worthwhile for Circular Ireland and DECC to develop planned roadmaps to 2030 and beyond with key sectoral stakeholders, including the research community, in order to assess what measures of progress would be challenging but achievable by 2030, and this can form a basis for long-term initiatives.

It is worth noting that NSAI is currently working alongside other national standards authorities affiliated to the International Standards Organisation on a globally agreed framework for the circular economy. This includes defining and measuring the circularity of economic activities at enterprise level, as well as regional and national level. The work will be largely completed by 2023, at which time the Circular Economy Strategy could be reviewed to assess whether the ISO circularity indices would either complement or supersede the Eurostat framework.

Would you rate Irish public awareness of the circular economy as high, medium or low? And how important do you think raising public awareness is to further developing the circular economy? What are the most effective awareness raising measures that could be taken under the Strategy?

Irish awareness of the circular economy principle is high but detailed understanding of the concept and its implications lacking. It is wholly necessary to develop deeper understanding and societal commitment to embracing the circular economy. Without public support, implementation of a circular approach is not possible. Measures to improve education at school and college level are needed. Efforts in terms of public engagement must be deepened and accelerated.

Numerous studies exist that analyse public awareness campaigns and resultant changes in attitudes or expected/ intended behaviours, demonstrating the gap between publics' knowledge of and

concern for the environment and implementing actions to protect it. In waste management behaviours specifically change in behaviours must be aligned to the provision of appropriate infrastructure for example. Changing consumption patterns towards reuse and repair may also need to consider the time to research appropriate information, location of services and cost. Awareness raising campaigns on the nature of the circular economy and its potential benefits is unlikely to result in concrete behaviour change on its own. That said, they can be an important device in the context of more participatory forms of public engagement.

If awareness campaigns are developed and delivered, these should be linked to pilot community scale participatory action initiatives. Models for this kind of activity already exist through The Rediscovery Centre, Tidy Town networks, or the Green Schools campaign. In addition, our suggestion to follow a mission based and systems thinking approach will necessitate the active participation of communities of interest, to test, experiment and engage with demonstration projects for CE implementation. A mission based approach also integrates communities with other stakeholders across public sector, local industry and civil society organisations, with the potential to build trust and a sense of collective responsibility.

Within such an approach, or within public awareness campaigns, systems thinking, or systems - based approaches must be considered. Such an approach is adaptive and dynamic, ensuring changes are considered within the entire system, and suitable adaptations to change can be considered - such as the political, technological, societal, economic or other changes. Systems dynamics are complex and system behaviours are useful for understanding sustainability to ensure that key pressure points are analysed and addressed (e.g. for resources, markets, society etc.) and to consider all the effects of change (e.g. rebound effects triggered, hitting ceilings of efficiency and effectiveness).

Are you satisfied with the proposed stakeholder engagement arrangements in the draft Strategy? Which additional stakeholders (if any), not already part of the Waste Action Group, do you think should be included in the Strategy's implementation?

We would stress the need for stakeholder engagement to cover as wide a range of actors as possible. Visible commitment of various actors within Government are needed. Deeper academic engagement is needed and investment supports should be a focus. The document also misses critical engagements on an all-Ireland basis as the circular economy must be a parallel process across both sides of the border.

The transition to the circular economy requires changes in entire systems; as such, new institutions of governance are required to bring together academics, technology centres, alongside multi-nationals and SMEs, primary, secondary and tertiary economic sectors, entrepreneurs, users and governments, as well as the public sector more broadly.

The Netherlands and the EU have recognised the importance of integrating the knowledge of the academic community into the governance of the circular economy. The success of Ireland's CE strategy and emerging circular approaches will not only be determined by technological, social and economic characteristics, but also by the quality of the interaction between actors in the system (businesses, governments, knowledge institutes, social groups), institutions (rules, laws, norms) and

technologies. Therefore, we suggest additional forms of governance are developed such as a *Research and Innovation for the Circular Economy expert high-level group*, to assist in the development and delivery of the Circular Insights' initiative, and that representatives from the research community should be included in all proposed cross-cutting governance arrangements.

What do you see as the major economic and/or social co-benefits of moving towards a more circular economy in Ireland, so that environmental improvements also provide economic and social opportunities, and vice versa?

The overarching benefit is that the circular economy provides for improved economic development in a sustainable way that nurtures our planet, maintains human wellbeing and restores and protects biodiversity. The de-localisation of the economy, a focus on the rural economy and the move from mass to sustainable consumerism is a pivotal change needed.

Societal values such as equality, sustainability, solidarity, public education and health care, security and social welfare are strongly embedded throughout EU policy and within the SDGs – highlighted within the consultation documents. The SDGs act as a powerful point of departure for rethinking Ireland's efforts, instruments and approaches to the circular economy, creating a truly sustainable outcome that benefits society and the environment through changes to our economy.

A mission-based and systems thinking approach requires bottom-up experimentation to solve dozens of problems, involving different types of partnerships, galvanising actors and institutions across public, industry and civil society. Missions are not purely technological or social, and hence, require even more focus on bottom up experimentation and public participation. This requires careful consideration around how to build in societal engagement from the outset to build capacity and trust in the institutions of the CE and democratic principles. For example, missions to address the CE transition will require changes in lifestyles, consumption patterns, jobs and skills, and can be perceived as positive and negative consequences for society. The notion of just transition must be incorporated into the CE policy, missions, and plans for implementation.

There is an opportunity for Ireland to deliver significant economic growth favouring FDI and indigenous industry. Given the expected changes in Ireland's corporate tax rate, providing a circular economy-friendly environment will both help anchor our multi-national companies and attract new companies. It will provide a strong spur to SME development and allow our products to reach appropriate standards that will emerge in the global market place in coming years. Consumer choice, providing appropriate incentives and structures are provided, will favour more sustainable products and Ireland can take advantage of these changes. It is also clear that circular economic compliance in terms of reuse, repair, remanufacturing and reverse logistics will favour creation of local skilled jobs and services. Targeting service industries should develop numerous jobs and create localised facilities to support the growth of repair, remanufacture and recycling businesses displacing employment inwards and create new types of jobs. Ambitious job creation targets should be set across short, medium and long term time-frames within the strategy, programme and sectoral roadmaps.

It should be recognised that the linear economy underpins the business model for all suppliers of manufactured goods and migration to the circular economy will bring significant market disruption.

This is particularly relevant to consumer goods with an emergence of a strong aftermarket of refurbished/remanufactured competitor products. This will have a negative impact on revenue and profitability of some businesses which may result in business responses such as competitive pricing and customer incentives which will work against the circular objective. Legislation and financial measures may be required to foster a healthy competitive market place in which original and remanufactured goods coexist and both types of companies should be held to the same obligations in terms of end of life plan for these products.

What do you see as the major regulatory barriers to the further development of the circular economy in Ireland? In answering this question please feel free to address economy-wide issues or those affecting your sector in particular

Legislation and practice in Ireland limits the ambitions of a circular economy implementation. Radical changes and incentives are required if circular practices and business are to grow.

Hard regulations, self-regulation as well standards and soft measures such as norms, values and behaviours all have some role to support the CE. Specifically, a truly circular economy has to focus first on reducing the need for new products, then on retaining end-of-life products or components and putting them back into the value chain. To address this the EU Commission has recently made proposals to revise EU legislation on waste to set clear targets for recycling and establish an ambitious and credible long-term path for waste management in the European Union. However, end-of-life technologies such as recycling to recover materials, although the most common strategy for closing the loop, is not enough. The economics of recovery and remanufacturing may initially be unfavourable compared to the use of virgin materials. In such cases, the development of markets for quality-assured secondary raw materials and components could be contingent on financial incentive.

We look forward to, and seek, active engagement with the Circular Economy Programme, as outlined in the consultation document. As suggested, we agree that the new Programme provides a key opportunity to promote circularity as an economic model and to enhance coherence and alignment among national, regional and local activities, and across public sector, industry, civil society, public and the academic community. This multi-stakeholder approach will assist in identifying the target of suggested supports such as innovation grants, sponsorships and seed-funding. This Programme can provide demonstrators, that address critical circular economy missions, generating knowledge and providing an evidence base to inform circular economy development in Ireland. By actively engaging with a wide range of stakeholders it can also seek to address key pinch-points and barriers across social, economic, technological and other interconnected systems.

What do you see as the major non-regulatory barriers to the further development of the circular economy in Ireland? In answering this question please feel free to address economy-wide issues or those affecting your sector in particular.

Implementation of the circular economy will require considerable investment and particularly Government investment. Research and innovation to allow circular strategies is required. We stress that implementing a circular economy in Ireland will require the level of funding support across research, innovation, infrastructure and business, equivalent to that seen for the current pandemic.

In a circular economy, R&I for sustainable and inclusive development, should become the central nodes in any narrative on Ireland’s future CE strategy. Trans-disciplinary basic and applied research to support cross-sectoral innovation is crucial to enable industrial symbiosis. Similarly R&I policy should support investment in research, development and innovation to address technical, economic, business model and social barriers towards the CE. A powerful basic and applied research agenda is a prerequisite for Ireland to generate and export knowledge and ensure its translation. We note that the EPA has articulated a ten-year high-level framework for research which identifies “Facilitating a green and circular economy” as a key strand, and will also continue to support Green Enterprise support schemes. It should be noted EU funded projects and National programmes, such as the SFI Challenge based research programme⁴ and the Disruptive Technologies Innovation Fund⁵, could also create key outputs of relevance here and should be harnessed. Investing in our research for next-generation circular technologies, such as advanced wood and timber products, green recycling technologies, waste valorisation, circular bioeconomy technologies, Carbon Capture and Utilization (CCU) technologies to name a few, can also create new jobs, and enterprise, further enhancing economic growth.

The circular economy requires R&I for new economic and business models and measures, such as the promotion of reuse and industrial symbiosis, setting up economic incentives to bring greener products to market, redesign the value chains, close material and resource loops and financial rewards for companies that support reuse, recovery and recycling schemes. Research and innovation strategies for the circular economy can also be of benefit, achieving change by identifying and articulating challenge-led missions that can galvanise innovation while transforming production, distribution and consumption patterns across various sectors. A key factor here will be to ensure that any financial supports put in place are not overly bureaucratic and resource intensive. This will enable full participation of SMEs and start-ups specifically which are generally resource poor and where bureaucracy can be 10 times as costly as for a large company. Also, as SMEs are more adaptive to change and are more innovative than larger companies (generally) they are key agents to operationalise CE in Ireland, so it is critical that any business supports are SME-friendly to ensure maximum SME participation.

Transformational research and innovation policy can help companies to make investments that would otherwise have not been made—extremely important in transitioning from linear to CE. Examples of research and innovation investment are well advanced across EU member states, with the Netherlands, Denmark and Slovakia providing useful exemplars. Similarly, the UK has recently announced a €30 million circular economy research programme to catalyse a shift to a more circular economy. The research effort will employ 34 universities and 200 industry partners to find ways to help businesses and society via the creation of one coordinating hub and five national research centres. The launch of strategic research and innovation actions aims to remove critical technology bottlenecks for large-scale industry adoption of circularity, facilitate investments, especially by SMEs, in piloting and early-market adoption of innovative enabling technologies and business models, also making use of regional funding instruments.

⁴ <https://www.sfi.ie/challenges/plastics/>

⁵ <https://enterprise.gov.ie/en/What-We-Do/Innovation-Research-Development/Disruptive-Technologies-Innovation-Fund/>

In Denmark R&I strategy has expanded and simplified access to financing of circular business models via public and private investment funds with focus on green investments. In addition, Innovation Fund Denmark grants subsidies for the development of knowledge and technology leading to an enhancement of research and innovative solutions to the benefit of growth and employment in Denmark. This makes capital available for enterprises with different levels of circular maturity. Also, a number of private initiatives have focused on building bridges between circular business ideas and investors such as The Green Development and Demonstration Programme.

How important do you consider Green Public Procurement is in supporting the development of new circular goods and services?

It is pivotal that the Government demonstrates leadership. Procurement processes should be developed that frame circularity as a key metric.

Green Public Procurement has the potential to effect real change with annual public spending at €6 billion⁶ the public purse is the largest consumer in the state. However, Ireland's GPP policy to date is voluntary and it is a guideline, therefore there has been very little uptake nationwide. Despite the various iterations of clear GPP guidelines from the EPA, it is unlikely to affect change unless there is a mandate in place. In the UK, there has been significant gradual improvements in the sustainability credentials of its supply chain since it was introduced as a mandatory measure. From September 2021, companies bidding for British government contracts must commit to net zero emissions by 2050 and publish their carbon reduction plans. Ireland's GPP needs to consider CE in buying decisions, particularly in high impact areas e.g. construction, food and ICT.

What would be the most effective action Government could take to promote/support and incentivise the further development of the circular economy?

Infrastructural support in key areas is pivotal. There also has to be an element of legislation first to ordain best practice.

A social and economic transition of the scale required by CE can be divided into four phases: a **development** phase with pioneers and fundamental research, a **start-up** phase with new applications and experiments, an **acceleration** phase in which existing actors and systems are put under considerable pressure by seasoned and new actors and systems, and a **stabilisation** phase in which the work method is institutionalised. Government can implement policy to help a circular product or service move from one phase to the next phase. Actions within these roadmaps could be categorised on a transition roadmap across sectors based on the following typology: **CHANGE** actions: identifying and optimising the changes; **START** actions: experimenting, scaling up; **STOP** actions: reduction, phasing out; and **REPLACE** actions: implementing, embedding, stabilizing.

The development of knowledge (education and research) and the dissemination and exchange of knowledge in networks are essential for the desired transition. This calls for a supporting infrastructure. The availability of knowledge that is important for the transition to a circular economy varies from one sector to the next. The development of information about material flows,

⁶ <https://ogp.gov.ie/minister-of-state-odonovan-welcomes-office-of-government-procurement-report-on-public-tendering-and-spending/>

natural capital, technology development, the labour market, and quality labels may yet all be required. A coherent and inter-connected policy regarding the creation of learning and experimental environments aimed at the circular economy is lacking. This underlines the importance of strengthening the collaborative ties between governments, businesses, civil society/ social enterprise and educational institutions.

We must develop proactive legislation to drive the circular economy. As above, legislation to increase both incentives for circular, and disincentives for non-circular, practices must be developed and Ireland could innovate here to very strong effect, favour creation of local jobs and services. Critical are legislative and tax reforms around:

1. With the introduction of the EU Sustainable Product Policy and EcoDesign Directive, Ireland should begin work on how to implement initiatives to ensure that Irish products placed on the EU market are designed to last longer, are easier to reuse, repair and recycle, and incorporate as much as possible recycled material instead of primary raw material. Creating a level playing field for prices in recycled and virgin materials will be an important factor here.
2. Serious consideration must be paid to create consumer incentives so 'right to repair' is equitably implemented and that all sectors of our communities can avail of this option to contribute to the circular economy.
3. Insisting on appropriate labelling and product data sheets to reflect degree of circularity based upon forthcoming international standards (e.g. ISO)

Which sectors do you think can make the biggest contribution to making Ireland's economy more circular?

Food packaging is often seen as the critical sector because of its link to plastic waste. It is equally important to target resource intensive industries such as ICT and agriculture.

We welcome the proposed development of standalone Sectoral Circular Economy Roadmaps, with significance to Ireland, such as construction, consumer goods and transport. A number of cross-cutting measures are required; for example, the supply of renewable, low-carbon energy; and the provision of cheaper, more efficient remanufacture and recycling technologies. Similarly, while the governance structures suggested in the consultation documents may provide some mechanism to enable oversight and cross-sectoral exchange, for example of by-products, a more detailed approach will ensure that connectivity between sectors is captured and managed. We highlight a number of key opportunities in each of the sectors below:

ICT: The ICT sector is the least circular and sustainable of sectors, from silicon chips, computer peripherals or data storage. We must develop research and legislation that enables the circularity of this sector to be increased. With 9/10 of the top tech, and 8/10 top global automation companies based in Ireland, there are distinct opportunities for Ireland to use these companies as a "pilot" to test various new technologies, and vice versa, for these companies to leverage their global experience, test, experiment and lead in this area.

Plastics and packaging: Uniform standards for the quality of recycled plastics, based on the requirements of the companies taking it and processing it are expected to lead to wider application of recycled material. Demand-controlled standards – with technical specifications for grades, types of plastic and product/market combinations – can be suitable for various sales markets such as packaging, construction and infrastructure, business-to-business, automotive and consumer products. Market demand for recycled material and product specifications are crucial. This information can form the basis for the standards that will in turn affect the chain of waste processing and production of recycled material. The net result will be a more transparent market in which precisely those recycled materials will be produced for which there is a demand. The application of Ireland's need for product and secondary market standards can be scaled up internationally (e.g. via members of the scientific community who work in Ireland and involved in CE working groups within ISO).

Construction: The draft measures outlined in the suggested roadmap are welcome, particularly measures to address Ireland's dereliction problem that will not only have economic and environmental benefits but key social benefits in addressing the housing crisis and protecting our architectural heritage by focusing on architecture for reuse. In terms of the materials we make homes from, we must move away from concrete and steel as principal building materials. Ireland has ample opportunity to create timber and renewable housing materials, for example, via the DAFM funded NXTGENWOOD project. Attention must also be given to the resource demands of National building retrofit plans.

Medical devices: Plastics are critical in terms of packaging and the base materials. 11% of waste in Ireland is medical waste (which has risen since the pandemic). We have 10/10 of top global pharma companies and 14/15 of top medical device companies based in Ireland. This makes us well placed to make significant change.

Manufacturing: We must develop manufacturing processes that are more circular, reducing waste and use of recycled materials. The manufacturing sector in Ireland has developed a lot of knowledge on Environmental Management, especially energy management, and waste management, are well placed to engage on circularity transitions.

Service sector: We must invest and develop our service sector for repair and maintenance. The move towards durable, repairable, extended life products is critical and we must nurture this sector through appropriate incentives. It is likely that there will be a significant skills shortage here, but also a massive opportunity for job creation and skills development. Given that repair and examples of the sharing economy are in place across EU member states, we can look to these for appropriate and translatable programmes and projects.

Forestry: EU member states expect increased demand for wood because of the shift to natural raw materials that will occur in a biobased and circular economy. A supportive, integrated regulation is required for better forestry management in terms of climate and biodiversity, as well as being socially responsible. There is considerable scope to increase the use of wood from Irish forestry in the construction sector, but significant changes are required to existing forestry regulation and planning, building regulations and insurance regulation to support this.

Research: We must provide significant funding across disciplines, from materials to legislation, from technological innovation to business models that will underpin a process to implement circular practices.

- How we define, measure and assess circularity is of critical importance. Creating frameworks for materials and products that allow for standard definitions, use of terminology and create meaningful product specification and product data sheets will anticipate compliance with future international standards for circularity and assist in decision making and monitoring the linear to circular transition.
- How to introduce and sustain new business models in which economic revenue is delivered from, for example, extended use, repair, leasing, shared-ownership schemes whilst understanding the social change needed to deliver these models.
- How and when to introduce changes in tax and legislation that favour value retention and recirculation of resources as opposed to the use of new resources. This will require new policies and legislation.
- How and when to encourage Industrial synergies and cooperation so that the full value of resources is harnessed across multiple uses.
- How to access and direct the financial, intellectual and social resources necessary to develop innovations that deliver new materials, new products, designs and standards that enable circularity.
- How to choose among the numerous opportunities that will arise to deploy investment capital wisely and with a broad set of return criteria.

Do you broadly agree with the policy areas listed for future development in the draft Strategy? If not, which areas would you remove/add to the list?

Policy does not reflect the nature of the Irish economy. Significantly greater policy inputs around manufacturing are required. We would also suggest that there has to be policy towards increased research funding.

The development of well-founded circular practices is, of course, critical in helping us meet environmental and ecological targets as well as compliance with waste policies, which is often considered as the main driver for development of a circular economy. However, this undervalues the principal driver and potential of the circular economy: a just and fair transition to a new economic model. This will affect society and all business, including foreign direct investment. If we do not invest in this transition, companies will gravitate towards countries that have the required ecosystem of infrastructure, support and legislation that allows their individual circular development. Our island-based manufacturing sector (contributes more than 30% of GDP in the ROI – 37% Q4, 2020) is heavily FDI dominated (OECD figures suggest 2:1 ratio compared to indigenous industries) and we must develop a circularity-friendly environment to maintain that investment and provide a platform for our own companies to prosper. Other sectors such as transport, construction, ICT and food production must also fully embrace the circular economy and circular bioeconomy. This requires not only investment but also innovation and research. There are numerous opportunities to develop new materials, new processes, new technologies and new manufacturing methodologies

to contribute to change. With the possibility of EU tax harmonisation and punitive US tax changes to offset their own economic losses, there is a necessity to develop a circularity ecosystem, which (a) supports and anchors our FDI manufacturing base as leaders across material supply networks (b) provides a rich environment for innovation and product development in new Irish companies and (c) helps Ireland to address the global environmental emergency of accelerated climate change. Correct policies and investments will augment Ireland's attractiveness as a location for continued investment (regardless of corporate tax rates) and catalyse the growth of indigenous industry. It is an imperative for us to lead, rather than follow, change if we are to prosper in the new economy that will emerge globally.