

Annex 1 Questions

1. Are you satisfied the outlined Pillars represent the structure of the Irish bioeconomy?

I am satisfied that the outlined Pillars represent the structure of the Irish bioeconomy. I like that the original 3 were broken down into 7 specific Pillars. I believe it is a lot more detailed than the former. I am quite pleased that there is a 'Communities' Pillar. I think it is very important to look at local bioeconomies and not solely at industry and enterprise bioeconomy. There is a lot of work that can be done in this area in tandem with the other Pillars. I also like the idea of the Governance Pillar. I think it is necessary to have a section that is in charge of major issues that have a knock on effect on the other Pillars.

2. Are there specific key performance indicators and/or targets the bioeconomy should be setting out to achieve to measure its implementation?

There are plenty of indicators that the bioeconomy should be setting out to achieve depending on their specific focus.

Economic performance: Indicators such as revenue, gross domestic product (GDP), and employment in bioeconomy sectors can be used to measure the economic impact of the bioeconomy.

Environmental performance: Indicators such as greenhouse gas emissions, land use, and biodiversity can be used to measure the environmental sustainability of the bioeconomy.

Social performance: Indicators such as access to education and training, community engagement, and poverty reduction can be used to measure the social impact of the bioeconomy.

Resource efficiency: Indicators such as resource productivity, material and water use, and waste management can be used to measure the efficiency and sustainability of the bioeconomy.

Innovation: Indicators such as R&D investments, patents and publications, and technology transfer can be used to measure the innovation performance in the bioeconomy.

3. What other key issues should the Governance Pillar deal with?

I think the Governance Pillar is addressing all the issues and tasks that I would associate with this Pillar such as regulatory coherence, awareness, communications and policies. There is no extra substance I would include in this Pillar.

4. What key issues should the Research, Development & Innovation Pillar deal with?

A big issue in Ireland is the wastewater treatment. Over half of the septic tank systems failed inspection in 2021. This is not acceptable and for a well developed country this should not be happening at all. There have been multiple incidents of high reports of E Coli in our water due to spillages. E.coli can cause serious stomach problems with severe vomiting and diarrhoea that can be dangerous, especially for children, older people and the medically

vulnerable. The Research and Development team needs to come up with ways to improve this infrastructure and ways to use this wastewater for possible biomass production. There has been a lot of research on the possibilities of reusing wastewater and they should focus on implementing some of these ideas. Information on this can be found here:

<https://www.epa.ie/news-releases/news-releases-2022/delays-in-fixing-failed-septic-tanks-is-unacceptable-says-epa-.php>.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9436125/>.

5. How could the RD&I bioeconomy approach be best structured to support the enhancement, application and scaling-up of biological knowledge and bioeconomy solutions?

This question is beyond the scope of my career path so it does not apply to my line of work and studies.

6. What key issues should the Nature, Climate & Circular Pillar deal with?

I think the Nature, Climate & Circular Pillar should focus on areas such as biodiversity conservation. This area would focus on protecting and restoring ecosystems and the species that are dependent on them. They should focus on what endangers these habitats and species and what they can do to minimise the negative impacts of bioeconomy activities on biodiversity. They should also focus on the soil. There were 137,500 farms in Ireland recorded in 2016. Ireland is a massive exporter of beef and dairy. We have an advantage due to our soil being rich in nutrients and the weather being suitable for growing most months of the year. This Pillar needs to focus on preserving the health of the soil through sustainable land use practices such as agroforestry.

7. What key issues concerning consumption patterns need to be examined to close the gap between sustainable supply of biological resources and demand?

Product labelling and certification: This covers initiatives to make sure that products are labelled and certified in a way that makes it simple for consumers to find sustainable choices and to promote the adoption of environmentally and socially responsible products. It is often quite difficult for consumers including myself to know which product between two is more sustainable. Companies often use words such as sustainable, eco-friendly, clean and natural on their packaging for greenwashing. There needs to be some sort of stamp or certification for how sustainable a product is in Ireland. For example, if a product is between a certain percentage threshold of sustainability such as 85-100% from renewable and sustainable sources it receives the highest grade stamped on the packaging. This will encourage companies to be competitive with each other to receive the highest grade, help consumers choose between products and will benefit the environment.

8. What key issues should the Agriculture, Food & the Marine Pillar deal with?

The Agriculture, food & the Marine Pillar should focus on minimising emissions in agriculture. In 2021 agriculture was responsible for 37.5% of all greenhouse gas emissions. This Pillar should focus on coming up with alternatives to reduce these emissions. There are multiple ways to reduce these emissions. Methane is a massive contributor to climate change. There

has been a lot of research in different ways to reduce Methane emissions. There is a team of scientists at CSIRO that have developed a patented feed for livestock. It is a seaweed grown in Australia. There have been tests that show that adding around 5g of their technology per Kilogram of dry feed lowers emissions by over 80%. Using this product in Irish livestock can reduce our emissions in the agriculture section hugely.

More information: <https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/agriculture/>.

<https://www.csiro.au/en/research/animals/livestock/futurefeed>.

<https://www.future-feed.com/>.

9. What key issues should the Communities Pillar deal with?

Similar to question 4 I think this Pillar should deal with the creation of biofuels from wastewater from Irish homes. This is an enormous sector that could possibly offer a lot of energy for the country. The Communities Pillar should also address the public, get their opinions and involve or educate them on the bioeconomy and what can be done to improve their lives and save the environment. They should consider adding more plants and trees in urban areas for carbon capture.

10. Are local and regional policies ensuring the consideration of bioeconomy opportunities are in scope, and are coordinated approaches on such services in place at regional assembly and local authority level?

This question is beyond my knowledge. As a college Engineering student, my knowledge in this sector is limited.

11. What key issues should the Industry & Enterprise Pillar deal with?

The Industry is responsible for a decent sized percentage of emissions in Ireland. There needs to be innovations for recapturing carbon or decreasing emissions in this sector. An interesting idea would be to focus on data centres. Data centres produce large amounts of heat. In countries such as Denmark data centres are used for heating of nearby houses. Meta in Denmark plans to heat 6900 homes this year by reusing this heat. Implementing this in Ireland would help reduce the remissions in the residential section.

More information: https://sustainability.fb.com/wp-content/uploads/2020/12/FB_Denmark-Data-Center-to-Warm-Local-Community.pdf.

12. What lead market initiatives could support entrepreneurship, development, innovation and the commercialisation of bio-based products, processes, information, and services?

N/A

13. Due to the requirement for capital and operational investment, what innovations aimed at financing infrastructures and technical and economic evaluation of innovation are necessary to scale up the bioeconomy?

In my opinion the government should look at managing their money better and focusing on what is currently important. The new national children's hospital being developed is being developed and is set to be one of, if not the most expensive buildings in the world with an estimated cost of over 2.4 billion. Creating a state of the art children's hospital is a great idea with increasing population and increasing health risks from birth. If the government created a smaller hospital or postponed the building of this hospital until it was a necessity, the funding for this could be used for the environment, which is a massive issue currently.

More information:

<https://www.independent.ie/irish-news/cost-of-new-national-childrens-hospital-could-soar-by-up-to-40pc-because-of-coronavirus-safety-measures-construction-industry-federation-warns-39218375.html>.

14. What key issues should the Knowledge & Skills Pillar deal with?

I think that the Knowledge & Skills Pillar should focus on the education and training of a skilled workforce. You can try to implement all of these changes, invent new technology and infrastructure but without a workforce, who have the knowledge on how these things operate and how to diagnose potential problems or hazards, you could be potentially putting the public in danger. There should be a focus on continuing this education of the workforce and possibly even making it compulsory to complete certain training to work in these areas. There should be a big focus on education in this sector as there will be an abundant amount of jobs created with these implementations. I believe these jobs need to be carried out by skilled and educated professionals.

15. Can the regional skills and regional enterprise approaches better support bioeconomy development?

By concentrating on building the unique skills and resources required for the expansion of the bioeconomy in a given region, regional skills and regional entrepreneurship techniques can aid in the development of the bioeconomy. This can include incentives for bioeconomy enterprises to locate in the area, training programs for workers in the field, and expenditures on research and development to assist the bioeconomy's expansion might all fall under this category. Furthermore, a regional strategy can aid in creating a favourable ecology for the bioeconomy by encouraging cooperation between neighbourhood firms, academic institutions, and governmental organisations.

16. An important part of developing the bioeconomy is to determine the most appropriate practices, treatments, technologies, logistics and business models to valorise ecosystem services, primary and secondary biomass resources. What role do advisory systems play in addressing this challenge?

These systems can provide expert knowledge, guidance and decision support to stakeholders such as farmers, land managers, policymakers, and entrepreneurs involved in the bioeconomy. They can help to identify the most suitable and sustainable options for utilising biomass resources and ecosystem services, taking into account factors such as local conditions, economic viability, and environmental impact.

17. Are there any further Pillars/Issues which this Action Plan should address?

I believe that the Pillars stated in this action plan are sufficient enough. Whether or not this action plan will be followed and focused on is the question. The government needs to make sure that the Pillars are looked at carefully and utilised when implementing changes in the bioeconomy.

18. Indicate what the top five priorities for action in the bioeconomy over the next three years should be?

1. Developing sustainable and efficient technologies for bioenergy production and bioprocessing: This can include research and development on advanced biofuels, bioplastics, and other bio-based products to reduce dependence on fossil fuels and decrease greenhouse gas emissions.
2. Promoting sustainable land use and management: This can include initiatives to support sustainable forestry, agroforestry, and conservation practices that protect biodiversity and maintain ecosystem services while also supporting the bioeconomy.
3. Building a skilled workforce for the bioeconomy: This can include training programs and education initiatives to develop the skills needed for the bioeconomy, such as in the areas of biotechnology, bioenergy, and sustainable land management.
4. Encouragement of private sector investment and entrepreneurship in the bioeconomy. This can be achieved by establishing advantageous legislative and regulatory frameworks as well as by offering financial and technical support.
5. Educating the public on bioeconomy. This can include teaching in schools and universities to promote a more sustainable environment and environmental practice. The public plays a big part in what products they are buying and how they are using and disposing of them. Educating them on their bioeconomy can inform people and change the lifestyle of people to support this action plan.