

1. *Does the broad definition outlined adequately encompass the opportunities presented by the bioeconomy?*

Yes, Irish Water supports this broad definition.

2. *How can a high-level policy statement on the bioeconomy assist in progressing the development of the priority value chains identified?*

Such a policy statement would have to be unambiguous in elucidating societal benefits to engender buy in. Public support is essential for a successful bioeconomy. It should not limit scope of support measures to sectors/groups that have been selected for active engagement with to date. If policy is perceived as supporting only existing large industry and associated researchers, societal buy in, which is essential for acceptance of outputs from initiatives may not be forthcoming. Equally in context of cascading principle this should not rule out initiatives that are low cost and energy related that may be affordable to local enterprises and/or individuals.

Furthermore, the high-level policy should contain a detailed valuation of the current bioeconomy in Ireland and entail the setting of specific targets (e.g., 10% renewable gas by 2025) where feasible to provide a metric by which progress can be gauged.

3. *What lessons can Ireland take from the European approach, including to the Circular Economy?*

A key issue identified in Europe is time frame for the evolution of an idea from concept to product. The EU recognise that start ups require support to scale up and that agility and ability to act quickly are key factors of success. Regulatory approaches differ from country to country in the way that precautionary principle is interpreted, and the extent to which transposition and interpretation of Regulations facilitates innovation evolving from scientific research to testable working prototypes. As such potential initiatives such as end of waste and by product development may be curtailed through lack of special provision for pilot testing at field scale without full scale permitting.

Irish Water would welcome the opportunity to collaborate with other stakeholders on the development of regulatory framework with the EPA and other relevant authorities supportive of innovative processes.

4. *Given the cross-sector nature of the bioeconomy, how can a national policy statement best support development?*

Whereas there has been much focus on sectoral value chains to date (e.g. agri food), a greater emphasis is needed on cross-sectoral approaches and barriers that exist to co-operation both institutional and from a remit perspective whilst also supporting community engagement. In the context of semi-state bodies, co-operation and synergies between different organisations offer significant potential for the development, implementation and commercialisation of novel and beneficial innovations in the bioeconomy sector.

For example a potential initiative might be the development and deployment of wood by-products (Coillte) with alum sludge (Irish Water) and farming sector (Teagasc) to develop filters for agricultural drainage. Canadian research on such filters indicates that they are effective in trapping phosphorous, agricultural antibiotics and nitrogen in runoff to adjacent water courses. Such initiative are potentially highly relevant in context of our agricultural base expansion plans and water Framework Directive and also could be applicable to dealing with septic tank effluents. Mechanisms supportive of such co-operation which would fast track delivery of trials and ultimately facilitate deployment at a national scale are required.

Significant issues also exist in transitioning research to product in the context of financial and proactive institutional support of trialling and providing assistance towards establishing market acceptance. In particular the risk carried by entities supporting the early deployment of innovative technologies in the context of regulatory compliance is a constraint on the development of the bioeconomy. The national policy statement should emphasise the potential for cost savings arising from cross-sectoral co-operation; resulting innovative solutions can represent least-cost measures to achieve national objectives.

5. Can we identify a common set of principles, including in particular the application of the cascading principle, which will assist in the development of both the bioeconomy and circular economy?

Yes. However principles need to differentiate as between those that apply in product development to accelerate such processes and those that relate ultimately to the developed product. Fundamental to this is an appropriate risk management approach.

A key concern is that principles as applicable to full deployment of an initiative are not consistent with those that need to be in place during trial and development phase. Innovation is not without risk and the effective management of this risk is fundamental to accelerated delivery of outcomes.

As such a holistic approach is required in developing an environment conducive to innovation. A least regrets approach to prototype testing would accelerate, and be inherently more informative, than trying to demonstrate scientifically that something has a high probability (or in some instances absolute certainty) in a working environment.

This set of common principles should emphasise the most beneficial aspects of the bioeconomy/circular economy, which include:

- Providing least-cost solutions,
- Boosting employment by fostering new industries,
- Reducing dependency on imported materials, and
- Promoting economic and environmental sustainability and security.

6. How can a national policy statement support local and regional cooperation around the use of renewable biological resources?

Local and regional cooperation can be enhanced by early community engagement and buy-in and adoption of a “benefit” sharing models. Models exist in the fields of delivery of wind farms in Denmark and sustainable community power in Wales. Local engagement at a very early stage of all potential stakeholders and participation in developing a clear plan as to how projects might progress and benefits shared would greatly simplify implementation of Bioeconomy initiatives.

7. How can waste policy, including an examination of the definition of waste, best support developments in the bio and wider circular economy?

Waste policy should provide for exemption from specific legal requirements for approved pilot trials. Consideration of exemptions should be on a multi-agency basis rather than by a specific regulator such that a holistic perspective on risk and potential benefits is taken.

Reclassification of processes (and associated waste streams where used in such processes) where a process can be demonstrated to be viable and acceptable will avoid duplication of regulatory process, facilitate rollout of initiatives and significantly decrease sectoral costs.

Recognition that to avail of opportunities, e.g. remediation or land enhancement projects, significant stockpiles of materials may be required to meet end user demands. This may entail storage of “waste” in excess of 6 months (currently requiring a licence to do so) to have adequate buffer to avail of opportunities where drip feeding of material is not technically or commercially viable.

8. How can we stimulate market demand for bioeconomy products? What is in it for the consumer?

-Developing an early understanding of potential use and acceptability of such products to the market place and addressing market concerns. Balanced dissemination of credible research and risk is required to inform the market.

- Development of a general awareness on the part of stakeholders of benefits; environmental, economic and societal; arising from Circular economy approach along with identifying tangible short and long term benefits.
- Removal of barriers to the development of worthwhile initiatives, thus increasing potential supply base, product development and ultimately development of the market for such products. Examples in water industry are recovery/struvite/alginate/Aqua Minerals (lime pellets/sludge, aquafer (GW), iron pellets, filters gravel, carbon sludge, humic acids).
- Avoidance of value fragmentation arising from mono-tech approaches. Focus on integrated solutions to address national targets for carbon reduction.
- Incentives based on Carbon substitution values, including support for renewable energy through the Renewable Heat Incentive.
- Addressing misconceptions effectively as they are identified through positive messaging via stakeholder engagement using acknowledged experts rather than adopting a defensive approach.
- Develop greater awareness of less palatable waste disposal alternatives e.g. landfilling, and incineration.
- Overcoming the “yuck” factor, by bringing stakeholders close up to products early on.
- Independent quality assurance to develop consumer confidence.

9. What is the most appropriate mechanism to coordinate development and monitor progress?

Ideally the process should be led by the enterprise development sector with engagement of all key national sectoral players.

10. Are there any other issues to be addressed through a national policy statement?

Recognising the priority value of the water sector would be welcomed.

The omission of wastewater and associated water and wastewater sludge by-products from priority chains is noted and needs to be addressed. The opportunity of creating positive value from what is perceived as both an environmental and economic liability appears to be undervalued. It is possible that financial rather than pure economic (environmental, societal and financial value) would seem to have influenced prioritisation. Significant international research in valorisation of wastewater has been undertaken and initiatives are being rolled out. Such recognition would impact positively on marketing of our “Green Image” which is underpinned by “sustainable” production of food.

Opportunities exist in harnessing wastewater effluent and sludge as a resource, in particular in context of:

- Fertilisers- Nitrogen/Phosphorous substitute for manufactured fertilisers through direct extraction or incorporation in algae followed by appropriate downstream processing which may include energy extraction. It should be noted that industrial nitrogen manufacturing consumes 1-2% of global energy supply, whilst peak phosphorous is predicted to occur c. 2035.
- Energy -utilising existing infrastructure, co-digestion and opportunistic effluent for irrigation growth medium and treated sludge as a soil enhancer.
- Recovery and management of Fats Oils and Greases (FOG's) and use for energy generation
- Biomass production such as high rate aerobic algal ponds, macrophytes and biomass crops with significantly increased yields,

- Feedstock-utilisation of sewage as a biological feedstock-bioplastics (PHA's), alginates, alcohols and inorganics and land reclamation leading to increased yields/not taking lands from food production.
- Algae as an animal feedstock/

Furthermore the use of existing infrastructure or the sharing of infrastructure where this is possible should lower commercialisation threshold.