



Rialtas na hÉireann  
Government of Ireland

# National Policy Statement on the Bioeconomy



February 2018

<b>Taoiseach’s Foreword</b>	<b>Page 2</b>
<b>PART 1 - GOVERNMENT POLICY STATEMENT ON THE BIOECONOMY</b>	<b>Page 4</b>
<b>1. The Bioeconomy</b>	<b>Page 4</b>
1.1 Purpose of the Policy Statement	Page 4
1.2 Developments at European Union Level	Page 6
1.3 Ireland’s Comparative Advantages	Page 7
<b>2. Government Commitments</b>	<b>Page 8</b>
2.1 Delivering on our commitments	Page 8
2.2 Analysis and Consultations	Page 9
<b>3. Policy Framework for Developing the Bioeconomy</b>	<b>Page 10</b>
3.1 Vision for A Successful Bioeconomy in Ireland	Page 10
3.2 Principles underpinning the Bioeconomy	Page 11
3.3 The Government’s Strategic Policy Objectives for the Bioeconomy	Page 12
<b>PART 2 - IMPLEMENTATION FRAMEWORK</b>	<b>Page 13</b>
<b>4. Putting in place the necessary infrastructure</b>	<b>Page 13</b>
4.1 Developing a supporting and enabling policy framework	Page 13
4.2 Key Actions	Page 15
4.3 Conclusion	Page 17
<b>PART 3 - APPENDICES</b>	<b>Page 18</b>
<b>5. Process Map</b>	<b>Page 18</b>
<b>6. Interdepartmental Group Membership List</b>	<b>Page 19</b>

## Taoiseach's Foreword



The recognition of climate change as a serious global and local issue is seeing the emergence of a new economic model focused on two principal pillars: low carbon growth and resource efficiency. Ireland needs to move beyond simply a target compliance and carbon mitigation focus to integrating sustainable economic development into our economic model as we transition to a low carbon economy.

Relying less on fossil-based resources and increasing our use of renewable biological materials is one significant way of accomplishing this shift, and this is an area in which Ireland enjoys important comparative advantages. Industry has not been slow in recognising the potential for materials and their associated ‘waste’ streams and by-products to be converted into valuable products. This is at the heart of the bioeconomy.

The bioeconomy extends from farming and the agri-food businesses, marine-based industries, forestry, waste management, energy suppliers, and pharma and bio-technology products. Ireland has flourishing firms in all of these sectors but much more can be done to unlock the bioeconomy’s commercial potential and its environmental benefits. Doing so will also help the agri-food and maritime sectors to deal with the uncertainties posed by Brexit by diversifying their product base.

Project Ireland 2040 - the National Planning Framework also highlights the potential of the bioeconomy in promoting more efficient use of renewable resources while supporting economic development and employment in rural Ireland.

The Government has already affirmed the importance of the bioeconomy and our vision is for Ireland to become a global leader in this area through a co-ordinated approach that harnesses Ireland’s natural resources and competitive advantage. The Government has recently allocated significant funding to develop a research centre and bio-refining capability to support our ambition for the bioeconomy.

This National Policy Statement is a further step towards our ambition to develop the bioeconomy. It has been prepared by my Department and is the outcome of extensive

consultation. It outlines the major challenges in expanding the bioeconomy. Among these are promoting greater coherence between the many sectors of the bioeconomy; strengthening the development of promising bio-based products and growing the relevant markets for them; and accessing funding available at EU level as well as leveraging private investment.

These matters can only be progressed by co-operation and collaboration between the public service, industry and the research institutes. The Government has mandated an implementation group jointly chaired by the Departments of Agriculture, Food and Marine and Communications, Climate Action and Environment to take forward a number of major actions, in close collaboration with bioeconomy industries and other partners, and report back to Government within a year.

A handwritten signature in black ink, appearing to read 'Leo Varadkar', with a long horizontal flourish extending to the right.

Leo Varadkar T.D.

Taoiseach

## **PART 1 - GOVERNMENT POLICY STATEMENT ON THE BIOECONOMY**

### **1. The Bioeconomy**

#### **1.1 Purpose of the Policy Statement**

Many countries are realising the importance of the bioeconomy in helping them move toward a low-carbon, bio-based and circular economy and society. They also recognise that the bioeconomy can assist them in meeting challenges such as regional development and employment growth by introducing new business models in rural and coastal areas; driving energy security by boosting the supply of domestic clean energy sources; maintaining and enhancing natural capital and protecting the environment; applying chemical and physical technologies to produce value added biobased products; and enabling a step change in the productivity of crops, animals and microbes through the application of biotechnology.

Increasing the scope of the bioeconomy would mean diminishing our reliance on fossil-based fuels and carbon intensive resources and boosting our use of renewable biological resources. Using these renewable resources and their associated waste streams for conversion into value-added products is at the heart of what is known as the bioeconomy.

The bioeconomy emphasises the importance of using an increasing list of renewable biological resources and in some cases what would have hitherto been discarded as residues or waste and putting them to more productive uses. It extends across sectors - from farming and the agri-food businesses, marine and maritime industries, forestry, novel protein production, water and waste management, energy suppliers, and biopharmaceutical products. Ireland has many promising pioneers in all of these sectors.

A prime example of what can be achieved in the bioeconomy is the success of Glanbia in transforming whey protein, a side-stream product of the dairy industry with hitherto limited value, into a critical ingredient in the global human nutrition market.

Further opportunities exist in the bioeconomy for Ireland to create economic growth, employment and a sustainable society through leveraging our policy, industry and research and innovation capabilities in natural capital management, agriculture, forestry, the marine, bio-based processing, biotechnology and pharmaceuticals.

Notwithstanding the success that individuals and firms within these sectors have displayed, it is clear that the bioeconomy in Ireland has enormous potential which is yet to be unlocked.

The purpose of this National Policy Statement on the Bioeconomy is to capitalise on this potential. It does so by elaborating on how the strategic development of the bioeconomy might be advanced through greater policy coherence across all relevant sectors and dealing with fundamental challenges to its commercial success and social development.

The Government has consulted widely with bodies within the public system and interested parties working at the cutting-edge of the bioeconomy in Ireland, whilst noting developments in the European Union and further afield. Incorporating insights from all these sources, this National Policy Statement sets out a vision, common principles and strategic objectives for the future development of the bioeconomy. It notes how government has provided public funding to establish the necessary infrastructure for growing the bioeconomy but there are still challenges in terms of generating greater policy coherence across all areas impinging on the bioeconomy; developing an appropriate regulatory regime for the bioeconomy that would encourage private investment; and stimulating market demand for bioeconomy products. The Statement sets down an implementation framework through which these matters can be further advanced.

## 1.2 Developments at European Union Level

The importance of the bioeconomy is being increasingly recognised internationally and nationally. The European Union published its [bioeconomy strategy](#) in 2012 which has amongst its principal goals to assist in climate change adaptation and the creation of jobs. It has been estimated that the direct research funding associated with the strategy under Horizon 2020 could help generate 130,000 additional jobs and €45 billion in added value by 2025. The strategy is structured around three pillars: investments in research, innovation and skills; enhancement of markets and competitiveness; and reinforced policy co-ordination and stakeholder engagement.

The EU bioeconomy strategy is supported by two EU research and innovation funding programmes called [Horizon 2020](#) Societal Challenge 2 (SC-2) and the [Bio-based Industries Joint Undertaking \(BBI JU\)](#). The latter is a €3.7 billion public private partnership which focuses on turning biological resources including terrestrial and marine resources as well as residues and wastes into greener everyday products through the development, de-risking and scaling up of innovative technologies and bio-refineries. The establishment of the BBI JU is designed to give a strong political signal to industry by providing a stable long-term funding framework that allows for strategic planning. This stability is vital in leveraging long-term investments from the private sector, in particular for demonstration and large-scale deployment activities.

The EU's Strategy was [reviewed](#) in November 2017 and found that while it had been successful in mobilising funding for research and innovation purposes, further investment is necessary for scaling up and rolling out new products and technologies. In turn, this requires a more stable regulatory environment to diminish uncertainties around investment funding.

The review also found that as the bioeconomy impinges on many different policy areas, such as the impacts of the increased bio-mass use on water, soil, ecosystem services and biodiversity, a greater level of policy coherence and appreciation of synergies is necessary.

The EU Bioeconomy stakeholders' panel, a group representing industry, public administration, researchers and civil society reinforced some of these points in calling for a stable legal framework which reduces regulatory uncertainty and for greater co-operation between sectors and actors along the value-chains associated with the bioeconomy.

The Commission also launched a [Circular Bioeconomy Investment Platform](#) in November 2017 through the Horizon 2020 SC-2 funding programme. This investment platform will be managed by the European Investment Bank. It is proposed that this public fund of €100 million will leverage private capital to fund technological validation, scale-up and industrial bio-refinery development.

The CAP Communication published in November 2017 on "[The Future of Food & Farming](#)" indicated that harnessing the potential of the bioeconomy and the circular economy should be considered as a means to address sustainability in rural areas through establishing sustainable rural value chains and business models to offer growth and job potential.

### 1.3 Ireland's Comparative Advantages

Ireland enjoys some important comparative advantages in relation to the bioeconomy and Government is determined to capitalise on these. Much of Ireland's advantage in the bioeconomy sphere can be attributed to its natural capital and relatively long growing season which arises from its temperate climate and fertile soils, with potential for growth up to 10 months of the year. Alongside its hospitable environment, Ireland has many other important assets relevant to the bioeconomy.

Ireland has a significant agricultural footprint with about 2/3 of its land devoted to agricultural use which is divided up into 140,000 individual farms. Agri-food is the largest indigenous business and accounts for 5.7% of our GDP. Approximately 10.7% of Ireland is under forests which produce 3.2 million cubic metres of material each year and this is forecasted to increase to 8 million by 2035. Ireland has one of the largest seabed territories in Europe which is about 10 times its landmass and is an enormous reservoir of genetic material



with a vast natural product potential. In 2016, Ireland's ocean economy had a turnover of €5.7 billion. The direct economic value was worth €1.8 billion or approximately 0.9% of GDP.

Ireland has also grown its bio-pharmaceutical sector rapidly with 24 out of the 25 largest bio-pharmaceutical companies having a presence here with the sector producing €39bn in exports. There is potential for increased alignment of the biopharma sector and the current bioeconomy actors to produce biobased products and services, for specific high value uses from renewable biological resources.

## 2. Government Commitments

### 2.1 Delivering on our commitments

The Government recognises that the bioeconomy is crucial for sustainability while also providing an impetus to rural development and employment. The [Action Plan for Rural Development](#) (2017) underlines how the bioeconomy can contribute to decarbonisation, sustainable growth and job creation in the agricultural, industrial and technological sectors in rural areas. With 80% of the agri-food sector based in rural Ireland, the potential for the bioeconomy to boost employment in regions is clear.

The opportunities are also recognised in the [Action Plan for Jobs](#) which committed the Department of the Taoiseach, in consultation with relevant sectoral departments, to assess the potential and conditions necessary for the strategic development of Ireland's bioeconomy across all sectors. An interdepartmental Group, chaired by the Department of the Taoiseach was established in November 2016 and assigned the responsibility for producing a high-level national policy statement on the bioeconomy aimed at producing greater coherence across the system. An initial scoping exercise was conducted with Departments and agencies to identify the current/potential activities in the bioeconomy arena. The primary focus of measures identified was on rural development, the valorisation of marine discard and agricultural waste

and the production of bio-energy from biomass/biogas. Key funding arises directly from the exchequer, SFI and the EPA and is also sourced from the EU Funding Programme for Research and Innovation, [Horizon 2020](#) (H2020).

## 2.2 Analysis and Consultations

To further this objective the Department of the Taoiseach, in conjunction with Teagasc, held a consultative workshop on future opportunities for the Irish bioeconomy in February 2017. The workshop brought together stakeholders and its purpose was to engage independent external experts to facilitate high level discussion. Nearly 60 people from a diverse range of backgrounds attended the workshop. Significant points emerging from the workshop included the need to develop a shared vision on the bioeconomy; progress a collaborative approach between relevant parties; and make suggestions on how to develop the bioeconomy in the years to come.

Incorporating the insights from the workshop, the Department of the Taoiseach then produced a [discussion document](#) for the preparation of a National Policy Statement on the Bioeconomy and invited interested parties to provide submissions on the subject. Fifty-one interested parties made submissions, and these were all analysed to assess how they could contribute to the finalised National Policy Statement.

Public consultation was important from two perspectives. It helped to flesh out the vision of what a successful bioeconomy sector might look like and it highlighted some of the main obstacles and the challenges to be overcome if this vision is to be realised. Some common issues were identified across many submissions, including the importance of developing an appropriate regulatory and monitoring system for the bioeconomy, the need for an appropriate innovation system and how to stimulate market demand for its products. These valuable insights have fed into this National Policy Statement on the Bioeconomy.

### 3. Policy Framework for Developing the Bioeconomy

#### 3.1 A Vision for a Successful Bioeconomy in Ireland

The Government's vision for the bioeconomy is to grow Ireland's ambition to be a global leader for the bioeconomy through a co-ordinated approach that harnesses Ireland's natural resources and competitive advantage and that fully exploits the opportunities available while monitoring and avoiding unintended consequences. An important objective of the bioeconomy is to move Ireland beyond simply a target compliance and carbon mitigation focus to integrating sustainable economic development into our economic model as we transition to a low carbon and circular economy.

There is increasing recognition at a European level of the potential benefits for economies and societies of adopting a circular economy that maintains the utility and value of products, components and materials in the economy for as long as possible. The bioeconomy has a close relationship with the circular economy and represents an area where Ireland has some crucial advantages. The bioeconomy should promote circularity through solutions and innovations that reuse and recycle materials, maximising resource efficiency through the use of unavoidable wastes and environmental sustainability.

## 3.2 Principles underpinning the Bioeconomy

The guiding principles that will help translate this vision into coordinated action include the:

**Sustainability Principle** - Environmental sustainability is an integral, core principle of the bioeconomy and products developed must be sustainable. Feasibility assessments should include environmental and social feasibility. The amount of biomaterial extracted should not have a negative impact on our biological resources; it should not exceed the capacity of the environment to replenish itself; and should cause no lasting damage to an environment. This should be regarded from a holistic view, which takes all biomass into account, including that in the soil. Activity in the bioeconomy should not degrade resilience or biodiversity in the ecosystem.

**Cascading Principle** - whereby higher value applications are preferentially derived from biological resources (e.g. food, bio-based materials and chemicals) prior to their use in energy and fuel generation which will allow us to derive the maximum value from our bio-resources.

**Precautionary Principle** - is a risk management approach to prevent policies or actions causing harm to the public or the environment. Innovation in the bioeconomy will depend on the sensible application of this principle and it should be informed by the latest scientific information and consensus.

**Food First Principle** - gives priority to food and nutrition security by improving the availability of and access to a safe and healthy food supply for citizens.

### 3.3 The Government's Strategic Policy Objectives for the Bioeconomy

In seeking to expand the bioeconomy, Government has several strategic policy objectives in mind:

**Sustainable economy and society** - Growing the bioeconomy can put Ireland's economy on a more sustainable footing by encouraging the efficient use and re-use of resources and materials to a much greater extent than hitherto.

**Decarbonisation of the economy** - the bioeconomy can play a part in lowering greenhouse gas emissions through, for example, the development of innovative practices and processes that can improve the efficiency in agriculture and forestry production systems. Bioprocessing and bio-refining can replace high embedded carbon products such as concrete, steel, plastics and chemicals with biobased alternatives and produce new products.

**Jobs and Competitiveness** - the bioeconomy can foster employment as many of the inputs for the bioeconomy are sourced nationally, so its development has a greater impact compared to other areas of the economy that are more reliant on imports. In this context, it is worth noting that as the agri-food and marine sector faces considerable uncertainties due to the prospect of Brexit, growing the bioeconomy represents an opportunity for this sector to diversify and reduce the risks confronting it.

**Regional Prosperity** - one of the advantages of the bioeconomy is that many of the businesses rooted in it are located in rural and coastal areas. Helping the bioeconomy to grow can assist in halting rural decline.

## PART 2 - IMPLEMENTATION FRAMEWORK

### 4. Putting in Place the Necessary Infrastructure

#### 4.1 Developing a supporting and enabling policy framework

The EU Bioeconomy strategy has three pillars:



Investments in research, innovation and skills



Development of markets and competitiveness



Reinforced policy co-ordination and stakeholder engagement

A significant and very recent demonstration of the Government's commitment in this area has been its majority funding through Science Foundation Ireland of the Bioeconomy Research Centre which the Taoiseach launched in September 2017. The purpose of the centre is to enable the transition to the bioeconomy through scientific research that will develop new products and technologies and stimulate rural development. Government has provided through Science Foundation Ireland funding of €14.2 million for a [Bioeconomy Research Centre \(Beacon\)](#) which will explore how to convert marine resources and the residues produced during food production into higher value products. This will be a fundamental catalyst in the future development of the bioeconomy in Ireland.

The Government is also providing €4.6 million in financial support through Enterprise Ireland's Regional Economic Development Fund for the establishment of a Bioeconomy innovation and piloting facility at Lisheen, Co. Tipperary. The facility will enable industry, entrepreneurs and researchers to scale technologies that convert Ireland's natural resources (including residues) to products of high value for use in a wide variety of sectors including food ingredients, feed ingredients, pharmaceuticals, natural chemicals, biodegradable plastics and more.

Over the past several years, the Department of Agriculture, Food and the Marine has funded a number of collaborative, academic-led bioeconomy related research projects including the Bio-Éire research project, led by Teagasc, focused on identifying and prioritising interlinking cross-sectoral value chains in the bioeconomy.

The [Bio-Éire project](#) identified the need in the short/medium term to focus on agricultural, marine and forestry resources through the valorisation of waste and side streams and the production of bio-based materials, bio-based chemicals and bio-energy. Value chains with significant short-term potential were identified as the use of dairy side streams for new food products and the use of agricultural / food waste for bio-energy production. The Bio-Éire project also highlighted a number of concerns in the bioeconomy for further consideration, namely the issues of: policy coherence, sufficient scale, international competition, economic/technological feasibility, market availability, consumer acceptance, legislation/regulation impediments, environmental sustainability, and the prevalence of robust supply chains, industry fragmentation and competition with food production.

Other significant developments include the establishment of the [Irish Bioeconomy Foundation](#) as a vehicle to bring together relevant stakeholders with an interest in establishing a National Bioeconomy Hub to be co-located with the Bioeconomy innovation and piloting facility at Lisheen, Co. Tipperary. In Monaghan, BioMarine Ingredients have established Ireland's first pilot scale biorefinery plant. In addition, a [Marine Innovation Park, Páirc Na Mara](#), has been established in Connemara to drive the sustainable growth of the marine economy locally, within the region, the country and internationally.

These developments indicate how active the bioeconomy has become in recent years. Yet it is clear that this infrastructure could be built on by increasing knowledge transfer and advice, cross-sectoral collaboration, innovation accelerators, the leveraging of greater investment and risk finance, growing relevant markets, fortifying market development supports and strengthening engagement to ensure that there is coherence across all relevant sectors. In doing so, there is an opportunity to avail of the funding being made available through the European Commission and combining this with resources from the private sector. Funding alone will not suffice to drive the bioeconomy forward. The important challenges of maintaining natural capital, developing an appropriate regulatory regime and stimulating market demand will have to be confronted.

## 4.2 Key Actions

One of the premises of this Statement is that the economic and environmental case for the bioeconomy is clear. The next step involves looking at how the commercial viability of the bioeconomy can be extended and intensified. In this context, Government has decided to establish a high-level Implementation Group which would be jointly chaired by the Departments of Agriculture, Food and Marine and Communications, Climate Action and Environment. The principal task of the Group would be bringing forward recommendations to develop the bioeconomy further and bring policy coherence to all relevant sectors with reference to the three pillars above and associated challenges.



Based on extensive consultation and analysis, a number of key actions for the future success of the bioeconomy in Ireland have been identified. These are as follows:

Ensure that there is coherence between all sectoral strategies which impact on the bioeconomy in Ireland.

Establish a network comprised of representatives of commercial entities operating within the bio-economy and relevant public bodies to inform the future development of the bioeconomy - this network may make additional recommendations to be followed up; (This could also include the sharing of best practice regarding applications for BBIJU, SC-2 and H2020 funding).

Encourage the translation of research into real world applications through promoting collaboration between research institutions (academia) and industry - through the use of pilots/demonstrations at the model demonstrator facilities (Lisheen site, the Marine Research Cluster in Connemara).

Assess the current legislative definition of waste and recommend whether a redesignation is necessary for residual waste flows to be successfully managed for use in the bioeconomy.

Ensure greater sectoral coherence within the bioeconomy through the development of risk assessment and management protocols regarding the use of by-products which encourages the piloting of opportunities.

Progress the leading value chain propositions identified in the Bio-Eire project by establishing the conditions required for their commercial viability and how these might be fulfilled.

Examine how greater primary producer, public and consumer awareness of the bioeconomy and its products could be built up - through knowledge transfer, advisory, sustainable business models, public procurement, consumer awareness campaigns and product labelling initiatives etc.

The Implementation Group will examine these matters and identify how they will be addressed. The Group will report back to Government by the end of 2018 through Cabinet Committee A which deals with matters pertaining to the economy, jobs and rural development.

In carrying out these tasks, the group will establish a forum and network to liaise with relevant industry bodies within the bioeconomy. An industry perspective is crucial as the bioeconomy will not achieve its commercial potential without the active involvement of the private sector through investment and the trialling and development of new bio-based processes and products. It will also be necessary to liaise closely with other leading stakeholders in the bioeconomy such as state bodies and community groups.

### 4.3 Conclusion

Development of the bioeconomy is also consistent with Ireland's low carbon transition objective. Favouring renewable biological resources over fossil fuel-based ones through the expansion of the bioeconomy, whilst keeping sustainability concerns to the fore, has the potential to contribute towards meeting Ireland's climate change targets. As the bioeconomy has the potential to grow rural and regional businesses and jobs, it is a useful instrument to embed pro-environmental actions. This Statement proposes that the focus of future actions needs to be based around strengthening the commercial prospects for the bioeconomy in Ireland.

As the bioeconomy in Ireland is in the early stage of its progression, the National Policy Statement has not identified individual sectors or targets which should be advanced as this would be premature. Instead, this Statement has concentrated on developing the key major pillars of the bioeconomy and ensuring that these receive the consistent attention of Government as Ireland moves towards the objective of a decarbonised economy by 2050.

## PART 3 - APPENDICES

### 5. Bioeconomy Process Map



## 6. The Interdepartmental Group on the Bioeconomy - Membership List

- Department of the Taoiseach (Chair)

- Department of Agriculture, Food and the Marine

- Department of Communications, Climate Action and Environment

- Department of Business, Enterprise and Innovation

- Department of Rural and Community Development

- Department of Transport, Tourism and Sport

- Department of Culture, Heritage & the Gaeltacht

- Department of Education and Skills

### Other Key Bodies Engaged:

- University College Dublin

- Teagasc

- Science Foundation Ireland

- Údarás na Gaeltachta

- Enterprise Ireland

- Marine Institute

- Environmental Protection Agency

- Bord Bia