DEVELOPING THE BIOECONOMY

A GUIDE FOR LOCAL & REGIONAL AUTHORITIES

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1. DETERMINE LOCAL & REGIONAL BIOMASS QUANTITIES & CHARACTERISTICS

Biomass resources available for valorisation may come from a variety of sources including, agriculture, forestry, aquaculture, agri-food & fisheries processing, biowastes (e.g., slurries, manures, wastewater, food waste, green waste). After identifying biomass resources, the quantities available must be calculated. Sources to gather this data from county up to regional and national levels include e.g. National Farm Survey[1], INFORMBIO project[2] and Central Statistics Office including its Irish Census of Agriculture[3] , farm structure survey[4], and forestry statistics[5].

Consider also the following when deciding upon what and how to valorise biomass: Is there a steady supply or is it seasonal? Is pre- or post-treatment required? Is the biomass already being used elsewhere? What are the characteristics of the biomass (moisture content, nutrients, heavy metals, etc.)? Can the use of the biomass be cascaded[6]? Consider transport and storage options before and after treatment.

2. IDENTIFY TECHNOLOGIES & BUSINESS MODELS

An important part of developing the bioeconomy is to determine the most appropriate technologies and business models[7] to valorise primary and secondary biomass resources. A focus on unlocking the full potential of biomass, by cascading and optimised valorisation of all the biomass components opens a spectrum of new types of bioeconomy business models. These are suitable for higher-value products, handling several more process steps and streams, and producing several types of biobased products where higher value applications are preferentially derived from biological resources (e.g. food, feed, bio-based materials and chemicals) prior to their potential use in energy and fuel generation which will allow initiatives to derive the optimum value from local and regional bioresources.

There are technology options available ranging from innovative biorefinery options to more established technologies including composting and anaerobic digestion. Information on suitable technologies can be found from the Circular Biobased Europe Joint Undertaking funded projects[8,9], the European Union Biorefinery Outlook to 2030 publication[10], European Parliament Technology options for feeding 10 billion people report[11], and national research projects[12].

3. CONDUCT FEASIBILITY, SUSTAINABILITY, MARKET POLICY ANALYSES

The most important aspect to developing a successful bioeconomy initiative is to ensure economic, social, and environmental sustainability. The economic potential of bioeconomy-based enterprises and products must be illustrated. Environmental sustainability is also an integral, core principle of the bioeconomy and products developed must be sustainable[13]. 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 also not degrade resilience or biodiversity in the ecosystem.

Consider economies of scale; co-operative systems allow greater recovery of resources and better return on investment. From a policy perspective consult the National Development Plan – Project Ireland 2040[14], the National Policy Statement on the Bioeconomy[15] and the National Bioeconomy Action Plan to understand the importance of bioeconomy to Ireland's sustainable development, climate action and circular economy. Organisations such as the Department of Agriculture, Food & the Marine, the BiOrbic Bioeconomy SFI Research Centre, the Irish Bioeconomy Foundation (IBF)[16], the Circular Bioeconomy Cluster South-West[17], the BioConnect Centre[18] and Nua na Mara[19] can assist with identifying funding, business model, and technology opportunities.

4. ENGAGE LOCAL STAKEHOLDERS

Bioeconomy should be integrated with Local Economic and Community Plans, Local Enterprise Plans, and County Development Plans. Local policies on enterprise, planning, environment, and local development services and support should ensure bioeconomy opportunities are in scope and coordinated approaches are in place at Local Authority Level. Regional Enterprise and Skills strategic development should also embed bioeconomy in its decision making.

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. The Local Enterprise Offices[20], the Irish Local Development Network[21], Chambers Ireland[22], ISME and IBEC[23] can support increased understanding of the bioeconomy as an opportunity including for example determining how projects relating to the bioeconomy can be prioritised based on addressing local challenges. Local enterprise support could also aid the development of enterprise parks which includes a focus on bioeconomy. Local Authorities could also create an industrial symbiosis register for local enterprises to identify potential biomass inputs/outputs[24] or examine co-alignment of bioeconomy and renewable energy including bioenergy opportunities.

5. FOSTER INNOVATION SPRINTS

Innovation sprint opportunities fostering initial collaborations between industry, local further & higher education institutions, and Innovation clusters can help jump-start bioeconomy projects. Relevant organisations include BiOrbic[25], IBF, BioConnect, Circular Bioeconomy Cluster South-West, Teagasc[26], Nua na Mara, Bord Iascaigh Mhara[27], and representative trade bodies such as Cré[28]. Specific project supports such as strategic consultancy, sustainability and digitalisation can be sought through Enterprise Ireland, Udaras na Gaeltachta[29], and 3rd level collaboration.

These organisations and institutions can help nurture entrepreneurial opportunities within the bioeconomy, providing knowledge, collaboration, expertise and research and pilot testing facilities for start-ups and other enterprises to develop bioeconomy value chains.

6. CREATE KNOWLEDGE & COMMUNICATION NETWORKS

Creating strong knowledge and communication networks between Industry, Enterprise Agencies, Local Enterprise Offices, Higher Education Institutions and Education & Training Boards helps local stakeholders identify potential collaborators and opportunities, nurture ideas, and skills needs and ensure ongoing integration of knowledge, science, technology, and innovation. Networks can help identify and share existing bioeconomy funding options and provide support for proposal writing. Financial and lending stakeholders can be engaged with through these networks. Discussing known/unknown opportunities and understanding barriers in an open forum can help the uptake and success of bioeconomy schemes. As an example, the National Bioeconomy Forum[14] was founded to provide a voice for a broad range of stakeholders. Integrating bioeconomy into relevant local forums can aid knowledge development, cooperation, and communication on the bioeconomy.

7. DEVELOP AWARENESS & COMPETENCIES

Develop awareness and competencies (training) in key bioeconomy supporting areas such as finance, business support services, and education. The Regional Skills Fora[30] can assist in mapping available skills gaps and in identifying knowledge & skills gaps.

Information and awareness of the bioeconomy should be communicated at targeted organisations and education-based centres and institutions. Exploring online information tools - the Irish Bioeconomy Map[31] - and events such as Bioeconomy Week Ireland can aid to incorporate bioeconomy awareness in relevant local courses and seminars. Specific information and guidance can be sought from targeted organisations, for example Irish Nutrient Sustainability Platform[32], Irish Farmer's Association[33], Cré, or other groups previously mentioned.

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FOOTNOTES

[1] National Farm Survey www.teagasc.ie

[2] Project to develop low carbon roadmap for Ireland's bioeconomy www.teagasc.ie

[3] Census of Agriculture www.cso.ie

[4] Farm Structure Survey www.cso.ie

[5] Forestry Statistics www.cso.ie

[6] Cascading use www.knowledge4policy.ec.europa.eu/home_en

[7] Business models, including higher value products for the new circular, resource-efficient biobased industry www.frontiersin.org

[8] Circular Bio-based Europe Joint Undertaking projects www.cbe.europa.eu/projects

[9] Developing a sustainable and circular bio-based economy in EU: by partnering across sectors, upscaling and using new knowledge faster, and for the benefit of climate, environment & biodiversity, and people & business www.pubmed.ncbi.nlm.nih.gov/33553123/

[10] European Union Biorefinery outlook to 2030 publication www.op.europa.eu

[11] European Parliament Technology options for feeding 10 billion people www.op.europa.eu

[12] National research funding www.gov.ie/en/publication/ce553-research/

[13] Biocircularity: A framework to define sustainable, circular bioeconomy

[14] Irish Bioeconomy Network www.irishbioeconomy.ie

[15] National Policy Statement on the Bioeconomy www.gov.ie

[16] Irish Bioeconomy Foundation www.bioeconomyfoundation.com

[17] Circular Bioeconomy Cluster South-West www.cbcsw.ie

[18] BioConnect www.bioconnectireland.com

[19] Nua Na Mara - Páirc Na Mara www.paircnamara.ie

[20] Local Enterprise Office www.localenterprise.ie

[21] Irish Local Development Network www.ildn.ie

[22] Chambers Ireland www.chambers.ie

[23] IBEC www.ibec.ie

[24] SymbioBeer project no.1 launched www.imr.ie

[25] BiOrbic Bioeconomy SFI Research Centre www.biorbic.com

[26] Teagasc www.teagasc.ie

[27] BIM www.bim.ie

[28] Cre Composting & Anaerobic Digestion Association of Ireland www.cre.ie/web

[29] Udaras na Gaeltachta www.udaras.ie/en/business/how-we-help/advice

[30] Regional Skills Fora www.regionalskills.ie

[31] Irish Bioeconomy Map www.irishbioeconomy.ucd.ie/bioeconomy-map

[32] Irish Nutrient Sustainability Platform www.nutrientsustainability.ie

[33] Irish Farmer's Association www.ifa.ie

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