Development of Governance Structures for Biomethane Projects

Midlands JTF Region

Biomethane for Carbon and Community (BCC) Project

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Report Contributors:

John Brosnan, Bioeconomy Executive, ICOS

James Doyle Legal, Counsel & Governance Executive, ICOS

Darragh Walshe, Legal and Development Executive, ICOS

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Executive Summary

Ireland has set ambitious targets for biomethane production as part of its climate, energy security and bioeconomy objectives with an ambitious 5.7 TWh output target by 2030. However, despite significant feedstock availability and strong policy drivers, the sector remains relatively stagnant at an early stage of development compared to many European counterparts. The Irish context presents a unique combination of opportunities and challenges, including dispersed and seasonal feedstock supplies, smaller average size farm structures (compared to international counterparts), evolving regulatory frameworks, limited specialist expertise, and the need for greater market certainty.

This report examines governance and ownership structures capable of supporting the development of biomethane and wider biorefinery projects in Ireland, with a particular focus on the role that co-operatives can play in mobilising feedstocks, aggregating stakeholder interests, and creating resilient long-term value chains. Drawing on Irish co-operative experience, European case studies, stakeholder engagement, and lessons from recent bioeconomy initiatives, the report evaluates how governance structures can be designed to support commercial viability, community acceptance, feedstock security, and access to capital.

The findings indicate that a purely investor-led approach may struggle to address key structural challenges within the Irish market, particularly in securing long-term feedstock supply, building community support, and capturing wider regional economic benefits. Conversely, a co-operative-centric, multi-stakeholder model offers significant advantages by bringing together feedstock providers, existing co-operatives, industry off-takers, local authorities, research-performing organisations, and finance providers within a shared governance framework. Such structures create stronger alignment across the value chain, reduce transaction costs, improve resilience, and enhance bankability.

The report finds that no single governance model is suitable for all projects. The most appropriate structure will depend on regional circumstances, stakeholder composition, funding arrangements, feedstock availability, and market opportunities. Nevertheless, common principles emerge. Successful governance arrangements should ensure fair stakeholder representation, maintain clear decision-making authority, balance investor

protection with service-user control, provide transparent entry and exit pathways, and support long-term operational flexibility as projects evolve.

European examples demonstrate that governance structures often change over time as sectors mature, facilities scale, and ownership consolidates. This highlights the need for governance frameworks that are sufficiently robust to support early-stage development while remaining adaptable to future growth.

The report concludes that biomethane projects should be viewed not solely as energy developments but as components of wider bio-industrial ecosystems. Large-scale, multi-output biorefineries supported by collaborative governance structures are likely to offer greater long-term resilience than energy-only business models. To unlock this potential, Ireland will require targeted project priming supports, enhanced collaboration mechanisms, more flexible funding instruments, and governance models capable of integrating diverse stakeholders around shared regional development objectives.

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1. Introduction

1.1 Context

The Irish Co-operative Organisation Society (ICOS), the national umbrella body for the commercial co-operative sector in Ireland, was commissioned by TUS in late May 2026 to carry out a high-level report on co-operative governance structures for the Biomethane Sector in Ireland. The purpose of the report is to examine the factors influencing appropriate governance structure design and selection which would be deployable in the Irish context of biomethane and indeed biorefinery facility developments. This is especially relevant in a nascent market with ambitious targets for biomethane generation in Ireland by 2030 (some 5.7 TWh)[1]. The report takes a multi-stakeholder view and encompasses the need to incorporate co-operative structures owing to farm structure and scale as well as the success of co-operative structure in delivering across the primary sector in Ireland for over 130 years. The intended audience include all relevant stakeholders who will be engaged in developing and growing Irelands bioeconomy, from Government Departments and policy makers to Local and Regional Authorities to research-performing organisations, providers of public and private finance, industry and primary producers and their co-operatives. The report is necessary as the collaborative/multi-actor approach to developing biorefinery or biomethane facilities has not yet been explored from a governance perspective contextualized for Ireland and for 2026 and beyond. It is hoped that the recommendations can help inform policy and industry actors in considering the importance of structural and governance model design in their future development plans, and to aid in the formation of regional consortia for commercial bio-industrial development.

As the representative voice for the co-operative sector and with dedicated in-house legal and governance expertise, ICOS has a key role in shaping how co-operatives of the future will interact with opportunities which may present in the broader bioeconomy. This will necessitate a more collaborative and multi-stakeholder approach than ever before as the bioeconomy crosses many sectors and disciplines and, in many cases, operates in nascent markets with immature value chains. The dispersed and often seasonal nature of feedstock supply as, a family or owner-operator farming structure and predominance of co-operatives will make them a vital component of a widespread and developed biomethane sector in Ireland.

[1] https://www.gov.ie/en/department-of-climate-energy-and-the-environment/policy-information/biomethane/

The Biomethane sector remains underdeveloped in the republic of Ireland relative to European counterparts[2]. There are many factors contributing to the slow development of the sector, many of which may be categorised as regulatory or support led. However, there are other factors which impede certainty and bankability, and these may best be divided into disaggregation and seasonality of feedstocks and an under-developed with an energy-centric market off-take focus. Irish pedoclimatic conditions are ideal to produce grass and indeed for grazing livestock. This means that while the country has a large bovine population of some 6.5 million cattle, (see figure 1 below), almost all these livestock are only housed for the winter period. Therefore, the majority of the manure arising is not captured, and the supply is seasonal as a consequence. In addition to grazing bovines, manure arises from the exclusively indoor commercial pig and poultry sectors on a year-round basis, making the combined tonnages of all manure types significant. Most of all manure types is landspread as a fertiliser, a data extract from the 'InformBio' project database in figure 2 below details tonnages and current fate. Some 16m tonnes of cattle slurry, 2.5m tonnes of pig slurry and 107,000 tonnes of chicken manure are captured annually according to this data. InformBio also calculates the grass produced for 'intensive' production for grazing and silage comes to 18.8m tonnes, whilst some 8.2m tonnes come from less intensively managed grasslands. Manures currently make up the bulk of available feedstock for biomethane production in Ireland and there is not as yet an established green biorefinery sector established which could allow for more grass to enter into biomethane facilities by virtue of the additional value created from protein extraction combined with anaerobic digestion. Much research has been conducted in the area of grass biorefining given the suitability of the Irish climate and soil types and its abundance in terms of current land use, and continues to evolve towards higher TRL commercialization[3]. The grass and slurry currently theoretically available is highly dispersed. With an average farm size of just 34.7 hectares[4]. and some 106,000 farmers engaged in bovine livestock farming, establishing a viable and reliable feedstock supply will be challenging, there will be higher transaction costs and assembly costs associated and switching costs are low for farmers. As new technologies and opportunities emerge to valorise feedstocks for farmer benefit, such as green biorefining or producing 'Renure' grade biofertiliser, securing these supplies with farmer needs in mind will be increasingly important to guarantee security of supply.

[2] https://www.europeanbiogas.eu/wp-content/uploads/2023/05/GIE_EBA_Biomethane-Map-2022-2023.pdf

[3] https://www.mtu.ie/news/2026/mtu-launches-green-biorefinery/

[4] https://www.cso.ie/en/releasesandpublications/ep/p-coa/censusofagriculture2020-preliminaryresults/kf/

The current regulatory environment presents challenges which may be surmounted through EU Commission regulation on Renure if adopted in Ireland. Renure represents an opportunity for livestock farmers with higher stocking rates (above 170kgs organic N/ha), to export their organic manure/slurry and to reimport the resultant 'Renure' products under a separate and additional nutrient allowance[5]. Currently, there are some 7,000 farmers who annually avail of a nitrates 'derogation' from the Department of Agriculture, Food and the Marine, allowing them to stock over 170kgs organic N/ha under certain conditions. These farmers in derogation who export slurry to a biogas facility cannot receive the resultant digestate back under existing regulations, therefore rendering this feedstock effectively unavailable, or requiring the exporting farmer to substitute manure/digestate manure/with chemical fertiliser.

1.2 Role of Co-operatives

While feedstock quantities may be large in aggregate, they are relatively small and dispersed compared to other EU member states with more intensive housed animal production systems. It is in this context that ICOS can foresee the need to involve primary producers in either purpose formed 'feedstock co-operatives' or indeed through their existing co-operatives to effectively and efficiently participate in biomethane and/or biorefining opportunities. The co-operative model has served the primary sector well both in the past and to this day in aggregating feedstocks, processing and valorising centrally at scale whilst enabling more effective market access. The dairy sector is an excellent example of this and has consistently delivered the highest margins and profitability of any of the main farming sectors in Ireland for primary producers. This has happened through multi-purpose dairy processing co-operatives or 'primary' co-operatives who are vertically integrated, providing farm inputs, advice and support right through to full value-added processing. There are interesting examples and insights which could be learned from, for example where two producer contingents exist side by side in the same multi-purpose (or effectively multi-stakeholder) co-operative. Tillage farmer members supply grain to a co-op owned mill and in turn this grain is milled into animal feed to be purchased by dairy farmer members – one member grouping (the tillage farmer) is seeking maximum price for their grain whilst the other grouping (dairy farmers) are seeking to minimise feed input costs, effectively divergent or opposing priorities.

[5] https://luxembourg.representation.ec.europa.eu/actualites-et-evenements/actualites/commission-adopts-new-eu-legislation-renure-fertilisers-2026-02-09_fr

This situation has evolved from a situation where 'mixed' farms once supplied both grain and milk, so there was no conflict of objectives upon formation.

However, through largely external factors, farms have become more specialised by production system and have moved from mixed to either dairy or tillage operations – hence this potential conflict of outcomes has arisen by evolution rather than design. It has also occurred through co-operatives involved in milk assembly who do not process in their own right, where milling operations are concerned. These examples could become useful signposts for feedstock co-operatives in the bioeconomy, as they engage the services of other co-operatives for the purpose of processing on contract or by way of other agreements.

In some cases, these co-operatives came together to jointly own and operate a 'secondary' co-operative, for example in the case of Carbery co-operative[6] which is jointly owned by Bandon, Barryroe, Drinagh and Lisavaird co-operatives. There is also the example of Ornua[7] which owns the 'Kerrygold' brand and is owned by constituent member co-operatives. There are recent joint venture developments where co-ops who established PLCs then embarked upon a JV structure where the co-op and PLC entity enter into a joint venture on processing facilities. Examples include Glanbia PLC and Glanbia co-op 'Glanbia Ingredients Ireland' JV which later was bought out by Glanbia co-op (changing its name to Tirlan) and Kerry Group PLC and Kerry Co-operative creameries JV initially known as 'Kerry Dairy Ireland', now 'Kinisla'[9].

There have been further examples of joint ventures in the dairy sector between co-operative and non-co-operative partners, but generally on shared processing of the same output, and therefore a shared strategic objective. Conversely, biomethane plants have either tended to be farm-scale or led by investor-developers at larger scales. The latter approach appears to be the predominant one being referred to in the Irish context of biomethane development. In the investor-led scenario, the primary objective is of course return on investment, and these entities must generate a profit in their own right. Financial investors, therefore, will generally not be embedded or interested in benefitting directly from the co-benefits or co-products as individuals or as corporate entities.

[6] https://www.carbery.com/about/heritage/

[7] https://www.ornua.com/history/

[8] https://www.tirlan.com/our-story

[9] https://www.kinisla.com/about-us/our-story/

In these investor-led scenarios, there will be no direct link to the primary producer and feedstock security of supply will be entirely dependent on legal agreements with external feedstock suppliers.
This will be based on an assumption that the pool of suppliers will not have more attractive alternative options in the medium to long term for these materials.

Similarly, these investor-led scenarios will be reliant on external market off-take agreements as market opportunities will also be external to this ownership structure. There is an inherent weakness in this model, as the smaller scale of feedstock suppliers will mean multiple agreements with associated higher transaction costs. Having external entities as market off-takers risks long term certainty as more attractive green energy options may arise with rapid technological development. An 'energy-only' outlook exposes facilities to increasing competition for feedstocks coming from multi-process biorefineries who will over the longer term be capable of delivering higher feedstock prices as demand rises for bio-based products, eventually rendering biogas/biomethane a byproduct. The co-op centric multi-stakeholder biorefinery concept overcomes these structural deficiencies though present more complex governance structures. The requirement for aggregation can be met through new or existing co-operatives which offer greater security of supply of feedstocks and lower transaction costs. Having locally known, trusted and embedded co-operatives owned and controlled by locals could assist in overcoming or preventing planning objections and/or fostering more positive community engagement. This locally embedded, multi-disciplinary and multi-stakeholder structure is closer to a true 'Quintuple helix' model, especially if state/local Government and research-performing organisations are included. This offers greater resilience while creating bio-industrial symbiosis opportunities and lowers risks associated with a 'top-down, investor-led' approach.

1.3 Challenges

The development of the biomethane sector in Ireland has encountered significant headwinds in Ireland and many challenges are peculiar to the Irish context:

- **Lack of clear strategic incentives**, compared to counterpart European member states, Ireland has lagged behind on clear and long-term supports for biomethane. Whilst other member states have opted for feed-in tariffs, contracts for difference[10], supported auction price or other long term supports which give 10-15
- years operational income certainty, Ireland has not pursued this route. Therefore, a more centralised multi-feedstock, multi-process and multi-output biorefinery may be more investable than an energy-only business model with digestate as the sole byproduct.
- **Underdeveloped gas grid**. Irelands gas grid has developed around the delivery of fossil gas to large urban centres and industrial users, effectively pipelines from offshore gas fields and international interconnectors to major cities and towns. Large parts of Ireland are not served by the grid from a distribution/transmission perspective and to date only one commercial injection site is operational. Alternative uses for gas may be required where grid injection via pipeline or 'virtual pipeline' (road tanker) is unfeasible. Having these market actors engaged as stakeholders may prove advantageous.
- **Dispersed Feedstocks** through smaller average farm size compared to international examples where larger and more intensive systems dominate. (See figure 1)
- **Alternative feedstock** 'fates' or end uses in existence and this may be embedded in existing value chains; these feedstocks may not be as footloose and available as potential developers consider in their projections. Feedstock providers will need incentives to break away from predominant existing value chain opportunities and may be enticed by more lucrative longer-term contracts as more biorefinery supply opportunities arise over time. For instance, straw as a feedstock may only be fully unlocked where the financial returns exceed what is offered through the 'Straw Incorporation Measure' (SIM)[11], and the soil carbon and soil health benefit of fractionated biofertilisers/soil conditioners exceeds the counterfactual using SIM.

[10] https://ec.europa.eu/commission/presscorner/detail/en/ip_26_794

[11] https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/services/straw-incorporation-measure-sim/

- **Regulatory Barriers**, from bio fertiliser and 'end of waste' regulation to the nitrates and renure, regulation is under review and could be significant enablers in mobilising agricultural feedstocks which require aggregation. Currently these are in the challenge or barrier category.
- **Security of supply of feedstock** allied to farm scale and distribution as well as the existence of alternative feedstock uses in many cases. (see table 1)
- **Favourable market access** compared to fossil alternatives – in the case of biomethane, the Renewable Heat Obligation (RHO) may present a partial solution in creating sufficient demand to underpin a minimum viable price. However, other instruments may be required to support not only biomethane price but also biofertiliser production capacity building. Co-operatives may also be market off-takers in certain circumstances for thermal energy requirements or indeed for heavy transport as well as biofertiliser.
- **Specialist expertise** to develop and operate biomethane facilities does not exist at scale in Ireland as it does in other more developed European market contexts. This expertise should be procured and managed centrally for the most effective and efficient deployment of the limited expertise available.
- **Community engagement** is an essential part of bringing a successful project to a bankable stage of development. Local support for projects is essential and is more forthcoming when communication is factual, open, transparent, and inclusive. Communication should be early and often. Co-operatives as locally known and trusted entities are mandated under co-operative principles not only to educate but also to have concern for community – these will be elaborated further in this document. This inclusive and collaborative communication strategy is preferable to a top-down approach.
- **Scale and diversified portfolio to access capital.** Projects of scale and who have less risk associated with the multi-stakeholder approach of bringing most or all market actors together should attract a lower risk premium and therefore lower cost of capital consequently.
- **Core organisational strategy** of any one potential partner in a multi-stakeholder JV/SPV may be outside the daily operation of a biorefinery facility. Therefore, having a separate entity with an appropriate representative and governance structure with specialised management and technical capability will bring greater strategic focus and dynamic capability to a biomethane/biorefinery facility.

- **Lack of a 'priming' support mechanism** for multi-partner commercial projects at scale is a hindrance to the formation of multi-stakeholder consortia and to overcoming the 'valley of death' between project concept and investible proposition. For modest investment, the high risk yet high potential phase can be overcome, taking a concept to high level design and initial business model development and financial modelling. Yet, there is no dedicated support or methodology as yet.
- **No coordinated project partner engagement,** allied to priming support, there is a need for structured, co-ordinated and perhaps mandated action around partner indentification and engagement with a view to forming a consortium which would lead to the design, funding, construction and operation of a co-owned facility.
- **Inconsistent project planning/development approach**. Although the planning system is currently under review, there appears to be anomalies in how it is applied or interpreted in certain cases, and in the unpredictable nature of negotiating the planning process.

1.4 Opportunities - the co-op centric multi-stakeholder approach

ICOS identified opportunities which could be unlocked through more widespread and structured collaboration. This was explored in detail through the 'Comhar BIA' feasibility study conducted in 2025 in the mid-west region. This study built on previous research conducted by ICOS on investigating farmer awareness and willingness to invest in bioeconomy initiatives conducted in 2023 as well as extensive engagements with members co-operatives. The farmer awareness/willingness study revealed a high level of positivity towards participating in anaerobic digestion and grass biorefining diversification opportunities. Further follow-on engagement with member co-ops through ICOS sectoral committees and meetings uncovered a willingness to develop or co-develop biorefineries in the right context, though some or all of the challenges outlined above were highlighted by co-ops as barriers. With this in mind, ICOS partnered with EU climate foundation, Climate KIC to conduct a feasibility study into the development of a co-op centric collaborative and co-owned biorefinery with an enabling shared services platform.

[12] https://icos.ie/2025/12/04/comhar-bia/

Funding was provided by Enterprise Ireland and was co-funded by the Golden Jubilee Trust[14] and focused on well-proven high TRL technology with anaerobic digestion as a 'spine' technology with other 'complementary' technologies to be added on a phased basis. The techno-economic aspect was carried out by specialist consultant engineering firm AtkinsRealis and included a high-level engineering design, whilst ICOS and Climate KIC focused on structure, and business and financial modelling. The study mainly centred on a physical facility, but it also investigated options for an enabling 'shared services platform' which would provide a more efficient, effective and consistent approach to specialist service provision in the development and operational phases of a collaborative multi-stakeholder facility. These specialist services could encompass for example: consortium and legal structure formation (legal and governance), technical and engineering, community engagement, planning/permitting/regulatory, business and financial modelling, feedstock and market off-take agreement drafting and execution, agronomy/nutrient management, ecosystem services MRV/accreditation, and logistics support. Following an expression of interest process, Arra Tipp Co-operative was selected as the 'anchor partner' and the study focused on the mid-west region. The study is relevant in the context of this paper as it validated the co-op-centric and multi-actor approach that would be required for deployment in Ireland. The study was endorsed by an advisory committee which consisted of many relevant actors including DAFM, DCEE, Teagasc, GNI, SEAI, ISIF/NTMA, BOI, Rabobank, MTU, UCD, the Irish Bioeconomy Foundation and others. Throughout the feasibility, key stakeholders were consulted by way of group workshops and bi-lateral meetings, these engagements uncovered key perceptions of the multi-actor approach, most especially around risk reduction, bankability and resilience:

- **Security of supply of feedstocks** by aggregating smaller scale suppliers through co-ops and ensuring their involvement includes a meaningful stake rather than relying on commercial feedstock arrangements alone. This was seen as a huge factor by finance providers and is often overlooked or underestimated in more investor-led scenarios.
- **A consistent and methodical approach** in both the developmental and operational phases through a networked shared services platform will ensure lessons are learned and disseminated to other regional projects.

[13] https://www.enterprise-ireland.com/en/supports/smart-regions-enterprise-innovation-fund

[14] https://goldenjubileetrust.ie/

- **Community engagement** and negotiating the planning system through a more involved and collaborative process, including known, local and trusted co-operative partners was viewed as valuable.
- **Deploying R&I in a phased and structured manner** through a phased approach and a feedback loop between RPOs and commercial partners.
- **Resilient 'whole of value chain' model,** involving all actors from feedstock providers to market off-takers in collaborative co-ownership viewed as a more robust and resilient model than relying on often untested supply and off-take agreements.
- **Industrial Symbiosis** brought about through efficiency and complementarity of co-location and collaborative/co-owned SPV structures. The 'Regional Bio-Industrial Park'.

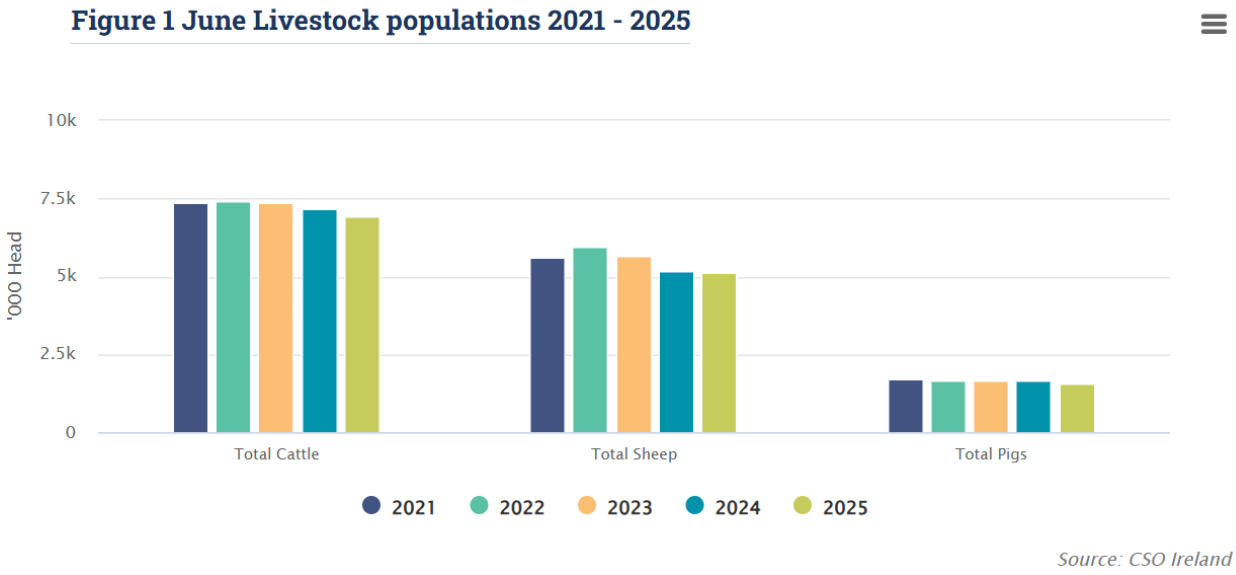


Figure 1 Livestock Population Irl 2021-25 (source: CSO)

Table 1 Data extracted from Inform Bio Database

	Slurry - Pigs		Chicken manure				Slurry - Other cows		Slurry - Bulls		Cattle 0-3yrs (rearing)		Slurry - Dairy Cattle	
Fate	Land	Total	Fertiliser	Compost	Pellets (bioenergy)	Total	Fertiliser	Total	Fertiliser	Total	Fertiliser	Total	Fertiliser	Total
Fate %	100	100	49.5	49.5	1.0	100	100	100	100	100	100	100	100	100
Total (‘ 000T)	**2,429**	**2,429**	**53**	**53**	**1**	**107**	**3,134**	**3,134**	**120**	**120**	**8,173**	**8,173**	**4,585**	**4,585**

2. Review of Governance Frameworks

2.1 Defining co-operative difference – Co-operative Principles

As well as being differentiated by their ethos, member-centric design and structure and co-operative legislation on the statute books, co-operatives are also differentiated and governed by seven internationally-recognised principles. This has been the case since the first set of principles set out by the first co-operative founders in Rochdale, UK in 1844. The spirit of the founding principles has remained relatively unchanged, and three revisions have taken place under the auspices of the International Co-operative Alliance in 1937, 1966 and most recently in 1995[15]. The current principles are set out in the table below along with an explanation of their general relevance and more specifically in the context of biorefinery development.

[15] https://ica.coop/en/cooperatives/cooperative-identity

Co-operative Principles and Biorefinery Co-ops

Principle	Relevance	Application Examples in a Biomethane/Biorefinery Co-op
Voluntary and Open Membership	Membership should be open to all individuals within the catchment and service area of the co-operative, with the caveat that they should participate economically on an ongoing basis by availing of the co-op's services. Membership is voluntary however and it is possible in certain circumstances for individuals to avail of co-operative services without being a member (for example in a retail co-operative scenario). This would not be recommended in the case of a biomethane/biorefinery co-operative as having passive users who are not members means that they are not tied to the co-op nor can they avail of member-specific services or benefits, thus eroding may of the benefits of co-operative structure.	Allows for members to join in a seamless and fluid manner as time progresses, and indeed to exit the co-operative by means of an appropriate and proactively managed share redemption policy. This is important in an biorefinery co-operative scenario for new generations, with expanded and relevant services attracting new users over time.

Democratic Member Control	The control of a co-operative is not governed by the size of shareholding, rather strictly on a 'one member, one vote' basis. Each co-operative member has equal say in the governance and direction of the co-operative. This makes for a very fair, equitable and robust structure for primary producer, community and indeed multi-stakeholder ownership.	Ensures that no individual or corporate entity can attain undue control or influence over decisions which may not be aligned with member interest. This means that facilities under co-operative control cannot be taken over in the operational or strategic sense by individuals, groups or entities who may not have the interest of the co-operative and its community at heart.
Member Economic Participation	All members should participate by means of actively availing of co-operative services, benefits arising from using these service should be in proportion to the level of usage. For example an end of year rebate as a percentage of annual trading value. The reward for active participation can vary as required by individual co-operative needs.	Ensures that the services of the co-op are relevant to members and also to allow for generational renewal by having an appropriate share redemption policy for those no longer actively availing of services for some time and having a fair and clear exit means set out in the co-op share redemption policy. Having a meaningful two-way economic relationship with active members, encompassing a 'design for use' philosophy.
Autonomy and Independence	All co-operatives are autonomous and independent legal entities with their own committees of management, governance structures and constitutions (rulebooks). This enables co-operatives to have full control over decisions that affect their membership. Constitutions can only be altered with member consent. Autonomy and independence does not prevent a co-operative from 'networking' with other co-operatives either on an ad-hoc or formalised service agreement basis. The Federation of Group Water Schemes in a good example in Ireland.	Autonomy and independence means that strategic and operational decisions are within a co-operatives control, with member interest central. This does not prevent a co-op from networking with other co-operatives or indeed other groups or entities in an informal, semi-formal or formal/legal basis. This autonomy and central focus on member need rather than dividend takes out an element of risk which may exist in other circumstances where autonomy and self-determination are not factors.

Education, Training and Information	This core principle helps both individual co-operatives and indeed the collective co-operative movement to grow and develop through supported training, development and continuous professional development. ICOS has a dedicated co-operative development function and also operates 'ICOS Skillnet' which offers funded training to co-operative board members and staff.	Through shared knowledge, information and training resources, local and regional biorefinery co-operatives have the ability to negotiate bottlenecks and knowledge gaps more effectively, especially where community leaders and stakeholders time and availability is challenged. Knowledge and education also fosters generational renewal and capacity building by equipping existing and prospective co-operative board members and with appropriate co-operative governance training.
Co-operation among Co-operatives	Co-operatives are expected to co-operate both within and across sectors within their catchments. In the case of biorefinery co-ops, it may be prudent to consider a networked approach to shared service delivery - where entities may be smaller and do not have the scale to justify employing full-time staff for certain specialist functions this could be overcome by either a federated or co-owned approach. This can also extend to larger regional facilities where extremely specialist expertise is required and a consistent approach can help to reduce risk, improve security of supply of feedstocks and market access and reduce the cost of capital. There are already precedents in this regard in the co-operative sector.	A networked approach may assist in the hiring of specialist expertise and administrative capability which would not otherwise be possible on a standalone basis

Concern for Community	Co-operatives being member-driven and people-centred rather than investment-driven have always played a role in community support either by way of local sponsorship of sports clubs for example or through offering services or facilities in times of hardship. There are also opportunities to involve communities more directly in multi-stakeholder models.	In the case of biorefinery co-operatives, this principle may cover the use of retained surpluses for the provision of funds for community-specific needs and there is a long history of co-operatives supporting local communities, not only through local employment and procurement of local goods and services but also in supporting local clubs and community initiatives. Co-operatives by their nature are locally-rooted and should therefore face less opposition to change or development of new facilities than an entity coming from outside the locality to develop a speculative or investor-led facility. Co-operative structure may present opportunities to issue development grants should the funding be available if a centralised 'shared services' approach is taken to foster growth and diversification.

2.2 Irish co-operative governance structures

Co-operative enterprises are unique and distinguished from other corporate structures for several reasons, one chief reason being the idea that the entity is established to deliver a service to its owners rather than a profit. That idea finds form in a co-operative that is a legal entity distinct in legal terms from its shareholding service users ('members') whilst being managed (via its supervisory committee of management / board of directors) to answer and deliver on the economic/social service needs of those members. To achieve that idea in practice Irish Co-operatives are structured such that the committee of management / board of directors is elected by and from, directly or indirectly, those members. Where membership numbers and/or the geographic spread of that membership warrants a more layered representative structure that can and will be accommodated in the legal structure. More fundamental however is that the decision-making mechanisms in the governance structure are fit and proper in delivering on the core idea of member control over co-operative purpose and service delivery. The list of ICOS affiliated co-operative societies[16] demonstrates just how relevant the structure is for diverse a range of sectors, scales and purposes, from local community-scale co-operatives to multi-billion-euro turnover export-led food processors that remain in farmer ownership and control.

2.3 Relevant EU renewable energy ownership models

While there are examples of novel renewable energy ownership models, many of these relate to community involvement in wind or solar projects and whilst there are some parallels, they differ greatly in that the capital investment required is often smaller, but crucially, they represent more passive and simple models. That is, once capital infrastructure is funded and grid connection and supply contracts are secured, projects generally proceed onwards through the permitting/planning system and installation is straightforward. The key difference is the passivity of the model once operational with a singular activity and output (electricity).

Even though Solar and Wind energy projects are far less complex than biorefineries at operational level and even at the development stage, they do encounter many of the same obstacles, particularly around grid connection, planning permission, technical advice and support, technology selection, legal, governance and financial modelling etc. Access to capital and community involvement/engagement are also common issues.

[16] https://icos.ie/our-members/

For community actors in the case of a community renewable electricity project from solar or wind, it may be more straightforward than an AD development as the local community may become consumers and/or indeed receive a financial return.

The 'ReScoop'[17] not for profit association was formed in Belgium in 2013 to address many of the common issues encountered by community energy projects in the EU, and according to their website "operate just like a co-operative". It is a 'sector federation' of Co-operatives Europe.

ReScoop now employs 20 staff members and are all based in Belgium, this is a diverse team of different nationalities and backgrounds. The coordination team takes charge of the daily operations of the association and reports to the Board of Directors.

According to ReScoop: *"the Board of Directors is elected by the General Assembly for 4-year terms. Members are eligible for re-election. The Board takes important decisions related to policy, strategy, and organisational planning. Board members control the budgets and supervise the coordinators. Their decisions are taken by absolute majority."* The board consists of 8 members from 7 EU countries.

There is a General Assembly which consists of all members; these include what are referred to as 'full members' and 'supporters. Full members are described as having *"voting rights and are either individual energy cooperatives or national/regional federations."* 'Supporters' on the other hand do not have voting rights and include other stakeholder groupings of "*related organisations, companies or local authorities*." The General Assembly emulates co-operative governance in that it adopts the democratic voting principle of "one member, one vote", and decisions are taken by absolute majority.

The association was established under legal statutes which were approved by the General Assembly upon formation and published in the official Belgian State Journal. The statutes have since been updated and approved by the General Assembly in 2025. Effectively acting as a representative voice and trusted source of information rather than a full 'shared services entity', ReScoop has four main objectives:

- Representing the voice of citizens and energy communities to European policy makers
- Supporting starting and established energy communities and provide them with tools and contacts to help them grow and prosper
- Facilitating international exchanges and cooperation between energy communities

- Promoting the cooperative business model in the energy sector

Services include: 'Community coaching' (bespoke volunteer and local authority capacity building); Advocacy; 'Organisational Development' (from strategy development to finance models, municipal-level collaboration, data & privacy and communication); a 'Toolbox' (successful case studies); and 'Finance' (primarily funding application preparation but also modelling to an extent). The ReScoop model is very interesting in bringing about a more consistent and structured approach to co-owned renewable project development, but the model would need adaptation for biomethane and the Irish context. The ICOS-led 'Comhar BIA' project also found significant merit in exploring the design of a shared services architecture more closely. The governance structure of ReScoop is certainly worthy of consideration as a design template.

As previously stated, biomethane differs in many respects to wind and solar, and is far more complex – from disparate biological feedstocks, more complex supply chains, and the wider biorefinery potential. In-country representative groups were consulted in three EU member states – Catalonia (Spain), Denmark and France. All present more mature markets for Biomethane than Ireland and have undergone change in how primary producers and co-operatives are involved.

Three long established and respected entities on co-operative involvement in governance/ownership structures in biomethane facilities in France, Denmark and Spain contributed these very practical overviews. These are La Coopération Agricole, the Danish Biogas Association and Hub de la Bioeconomia de Catalunya (Catalonian Bioeconomy Hub) with a current example from a Spanish Agri Co-op project developer. Based on this report timeline, there was insufficient time to schedule in-depth interviews with these commercial contacts, however, their high-level synopses are outlined in the following section. Elements of these could inform future templates for Irish commercial biorefinery development and are worthy of further in-depth exploration by way of interviews with key stakeholder contacts identified in the organisations consulted.

[17] https://www.rescoop.eu/

France

It would be accurate to state that the French anaerobic digestion sector is predominantly agricultural, with a predominance of small-scale units operated by individual farmers and small groups of farmers. There are several examples of cooperatives that hold shares in or own anaerobic digestion units. Newer models are more mixed (multi-stakeholder), involving private sector players such as developers or bio-waste management companies such as SUEZ[18], who have recently partnered with farmer-owned co-operative EMC2[19]. This partnership will see collaboration between a large farmer owned co-operative (annual turnover €440m) and specialist biomethane developer Suez, with references to solving Local Authority 'waste issues' also mentioned in this context. According to La Co-operation Agricole, there are several examples of plants where local or regional authorities are involved. The exact ownership and governance structures are difficult to decipher based on translated publicly available information and are worthy of further analysis. In the dairy and livestock sectors, there are again several examples, but in the dairy sector specifically, the plants tend to be owned by member farmers rather than the co-ops themselves (smaller farm-scale).

Denmark

It is widely known that most of the Danish biogas plants were owned by farmers in co-operatives until 10 years ago. Since then, the new biogas plants have been established by other investors – and many of the former co-operatively owned plants have been sold to those regarded as "professional investors".

Today, there are only two large scale biogas plants left owned by the farmers in co-ops: Linkogas[20]and Lemvig Biogas[21]. The latter is in a process to secure a buyer for the plant for the last two years and has a mixed feedstock and as well as manures. It processes Fish waste, Source-separated organic household waste, Slaughterhouse waste, Feed waste/residues, soft drinks, beer, alcohol, pharmaceutical waste products and bacteriologically or chemically contaminated foods.

[18] https://www.suez.com/en/waste/waste-recycling/renewable-energies/food-waste-anaerobic-digestion
[19] https://www.emc2.coop/
[20] https://www.linkogas.dk/
[21] https://lemvigbiogas.com/GB.htm

Linkogas on the other hand seems likely to continue as a co-op. Linkogas is 100% farmer owned and processes some 600,000 m^3 of animal manures annually and produces some 17,000,000 m^3 of biomethane, with 80% of all feedstocks coming from manures. A couple of years ago the former CEO of the Danish Agricultural and Food Council was appointed as new chair following a milk producer who had held that position for almost 35 years.

Denmark does have a few plants where the farmers organized in co-operatives in relation to suppliers of manure to the plant and are co-owners with a minority ownership, effectively a 'feedstock co-operative'. There is one example where the biomass supplier has majority ownership and Shell Biogas is a minority owner (Ribe Biogas)[22]. In the past, Ribe was jointly owned by a farmers co-operative and commercial slaughterhouse: *"The 62 farmers supplying slurry to the biogas plant are members of the cooperative association of biomass suppliers, Ribe Biomasseformidlingsforening a.m.b.a., which owns 5/6 of the shares of Ribe Biogas A/S, while 1/6 of it is owned by Danish Crown slaughterhouse."* (IEA factsheet)

In addition, Denmark continues to have several (approximately 30) farm scale biogas plants owned by a single farmer or small groups of farmers.

In the past, local utilities were investors in several biogas plants such as Herning Municipality with three biogas plants in Studsgaard, Sinding-Ørre and Hodsager where the first two are now owned by specialist AD plant developer-operator, Bigadan. The same was the case on the Island of Bornholm (now also owned by Bigadan); Aarhus (now owned by Shell Biogas); Holstebro (now co-owned by farmers in supplier co-op) and Skovgaard which is owned by a Japanese industrial group. Therefore, the conclusion can be drawn that municipalities and utilities were among the frontrunners 20-35 years ago – but now all of them have left the sector. The Maabjerg BioEnergy plant in Holstebro[23] is interesting in that a co-operative of 135 farmers called 'Måbjerg Biogas Leverandørforening' holds the asset jointly with Skovgaard Energy which operates businesses across the green energy spectrum from wind to solar and biogas and more recently power to X. The strategic location of Holstebro is also significant as, according to a 2022 Bioenergy International article, it is planned to be developed as a major hydrogen hub, fitting well with larger scale biomethane production.

[22] https://task37.ieabioenergy.com/wp-content/uploads/sites/32/2022/03/Success_Story_Ribe2012.pdf

[23] https://task37.ieabioenergy.com/wp-content/uploads/sites/32/2022/03/maabjerg_case_story_web_final.pdf

Also of note is that the former natural gas infrastructure company Naturgas Fyn on the island of Funen sold the gas pipe infrastructure and invested in 13 Danish biogas plants under the name Nature Energy which now is Shell Biogas.

Catalonia Spain

The clearest Catalan example is Alcarràs Bioproductors SAT[24],near Lleida. It is not a dairy co-operative as such, but a farmer-owned agrarian company / Agrarian Transformation Society created by around 150 livestock farming families from the pig and cattle sector to address a shared manure and slurry management problem.

The starting point was not an energy project, but a livestock manure management challenge in a high-density farming area affected by nitrate-related constraints. Farmers organised collectively, acquired a site, and first developed a composting facility before adding biogas/biomethane as part of a wider bioindustrial site.

The key governance feature is that the project is 100% owned and promoted by farmers, with no participation of external investors. The feedstock providers are not just suppliers: they are the owners and strategic decision-makers.

The facilities combine composting, biogas generation, and digestate valorisation. Manure, slurry, and other organic residues are transformed into high-quality compost/biofertilisers, and biomethane for CNG, virtual pipeline or grid injection.

The business model under development (potential uses) includes several value streams: compost and biofertilisers, energy generation, biomethane sales, certificates of origin, possible local gas filling for agricultural machinery, potential CO_2 valorisation, and the development of the wider site as a space for other bioindustrial activities.

In terms of scale, the biogas-linked facility has a treatment capacity around 126,000 tonnes/year of organic matter, with two digesters of 5,617 m^3.

Public bodies are important enablers, but in this case, they are not owners. Support has come through planning/permitting, territorial coordination, BioHubCat and the Lleida Shared Agenda framework, and public financing support through the Catalan public finance institution. The ownership and governance remains farmer-led.

[24] https://bioboost.cat/en/alcarras-bioproductors/

More generally, in Catalonia and Spain many farm-scale biogas plants are linked to individual farms or agri-food operators, while larger biomethane projects often involve private industrial or energy developers. Alcarràs is therefore particularly relevant as a strong farmer-owned model, but it is quite unique in terms of the role of the farmers and their capacity for self-organisation.

The main lesson is that the interesting point is not only the technology, but the governance sequence: a real manure-management pressure, sufficient feedstock concentration, a producer-controlled legal vehicle, collective investment capacity, and supportive local/regional institutions. It is clear that where the needs of primary producers are central to the business case, long-term commitment of feedstock should not be an issue. Indeed, in this particular example, if the business case for the biorefinery delivers clear economic benefits for the farmers themselves, then they may be more willing to invest.

The examples cited above demonstrate that primary producer needs being met will assist with long-term stability but also that scale enables significant value-adding opportunity that cannot be achieved in smaller plants where such technologies would be uneconomic. This, combined with smaller scale dispersed farms, strengthens the case for the multi-actor approach in Ireland to have resilient biorefinery facilities with sufficient scale to capitalise on complementary co-located technologies and to achieve true bio-industrial symbiosis. This may involve pre-processing or 'hub and spoke' facilities to improve bulk density for transport efficiency.

2.4 Joint venture (JV) and Special Purpose Vehicle (SPV) structures involving multiple stakeholders

Governance requirements to meet different stakeholder needs under a multi-stakeholder scenario may be complex and require localisation on a case be case basis. Stakeholder requirements need to be treated fairly and equitably in the design of governance structures with clear roles, benefits and entry/exit pathways. Where primary producer or co-operatives are concerned, the design of governance structures should be within the spirit of co-operative principles/ethos. The table below was compiled by ICOS as a general starting point of what value a multi-stakeholder structure could deliver by stakeholder type and whether that stakeholder could/should become a shareholder. This approach is worthy of further refinement and analysis through engagement with relevant stakeholder groupings.

The legal entity which maintains ownership of processing facilities need not necessarily generate a profit beyond what may reasonably be required for self-sustainment. In other words, there may be value created or costs reduced to such an extent for constituent stakeholders that direct financial return on the commercial activities of the facility itself may not be a priority, rather the true value resides in its enabling activities or outputs relevant to each stakeholder. The challenge with designing appropriate representative and governance structures may prove to be the management of these enabling activities/outputs as their benefit may vary between stakeholders or indeed some may be at cross purposes – such as maximising value for feedstock providers whilst minimising cost for market off-takers.

Biorefinery Stakeholder Group by Type and Benefit				
Stakeholder Type	**Value of Multi-Stakeholder Approach**	**Shareholding Req (If investing)**	**Benefit beyond ROI (If investor)**	**Comment**
Civil Society	Regional economic growth, future-proofed job creation in rural areas, social, climate, water and biodiversity benefits/improvements	Unlikely	Yes	Optional to have a community stake
Bioeconomy Clusters, Industry Representative groups	Alignment with objectives of cluster members	Unlikely	Yes	
Electricity Grid	Interaction with and complementing the electrical grid, with dispatchable 'peaking plants' powered by biogas in near term, power to X in longer term when combined with green hydrogen production	Unlikely	Yes	
Primary Producer Representative Groups	Creating more income diversification opportunities and resilience for members, achieving sectoral emissions targets and future-proofing agriculture, forestry and marine from the primary producer perspective	Unlikely	Yes	
Gas Grid Operator (GNI) and Utility Providers	Increase Biomethane percentage in the grid, meeting obligatory targets through	Unlikely	Yes	

	indigenous gas - security of supply			
Govt Departments	Cross-Sectoral Emissions Reduction, Water Quality and Biodiversity Improvement, Applied R&I Deployment, Lower Friction Planning/Facility Deployment, Lower Failure Rate for Grant-Aided Projects, Economic Growth and Resilience, Import Substitution, abatement of CO2e fines from missed sectoral targets	Unlikely	Yes	
Large Scale Industry off-taker (Data Centre)	Decarbonisation - also now a condition of planning for new centres to source own green power requirements. Also, a 'licence to trade'/CSR	Likely	Yes	
Large Scale Industry off-taker (Pharma)	Decarbonisation of process heat, may be an opportunity with BioPharma for additional value-add	Likely	Yes	
Large Scale Industry off-taker (Aviation)	Decarbonisation, market off-taker in the long term for Sustainable Aviation Fuel (SAF) with biomethane as a complementary process	Likely	Yes	

Food Industry (Private) - e.g. meat processing, brewing/distilling, fish/seafood/seaweed processing	Integration of processing facilities into the value chain as feedstock suppliers and potential market off-takers, meeting climate and biodiversity targets/objectives, creating new value opportunities. Potential for use of food/feed byproduct valorisation (waste to value).	Likely	Yes	
Food Industry (Co-operative)	Integration of processing facilities into the value chain as feedstock suppliers and potential market off-takers, meeting climate and biodiversity targets/objectives, creating new value opportunities. Potential for use of food/feed byproduct valorisation (waste to value). Co-operative food processors can also aggregate farm-level feedstocks for direct biorefining such as animal manures, grasses or other crops. Where these processors are vertically integrated (input providers), they could also become a	Likely	Yes	

	customer for biofertilisers. There is the possibility to protect the existing supply chain by providing a key enabling service (e.g. nutrient management where surpluses arise)			
RPOs/Pilot and Demonstration Facilities	Opportunity to co-locate research/pilot/demo facilities, to deploy R&I and to inform research through direct industry collaboration	Unlikely	Yes	
National Planning Authority	Planning policy alignment, consistency in approach to planning	N/A	Yes	
Pillar/Retail Banks	Greening and increased resilience of loan books	Likely	Yes	Non-financial benefit will be minimal, likely to be debt rather than equity
Philanthropy	Alignment with green finance/philanthropy climate and biodiversity aspirations/objectives	Likely	Yes	

Insurance Sector	De-risking against future claims via climate positive activities and results, seeking to scale carbon projects and reduce the cost of insuring project buffers	Unlikely	N/A	
Producer/Feedstock Co-operatives	Special purpose co-operatives established to aggregate feedstocks and co-ordinate logistics. Providing conduit for surplus animal manures or forest residues for instance. Co-designing value chain solutions (e.g. Biochar with AD)	Likely	Yes	
Livestock Marts	May become useful regional co-ordinators of primary producer members, as legal structures are in place as are staff and often under-utilised facilities. Opportunity to provide a site in some instances. Will be feedstock on-site (animal manures and wash-down)	Likely	Yes	
Public Finance (Where equity stake is required)	Deployment of resources to meet their strategic climate and fiscal objectives	Likely	Yes	
Private Finance (Where equity stake is required)	ROI - yield expected will reflect green credentials but also risk profile	Likely	Yes	

Local/Regional Authorities	Regional economic growth, social, climate, water and biodiversity benefits/improvements	Likely	Yes	
State/Semi State Agencies (E.g. Teagasc, EPA, SEAI, Coillte, BIM)	Deployment of R&D, achievement of climate objectives where mandated	Likely	Yes	

3. Defining ownership structures

3.1 Co-operative ownership models

Irish co-operatives have three broad ownership and membership models:

1. Primary Co-operatives (individual membership)
2. Secondary/Federal Co-operatives (membership of co-operatives)
3. Hybrid or Mixed-Membership Co-operatives (combining individual and co-operative membership)

Each model serves different economic, social and organisational purposes while still delivering member benefit, member ownership and member control. Some of Ireland's most successful agricultural cooperatives historically began as primary farmer cooperatives and subsequently developed federal characteristics through mergers, shared processing infrastructure, and regional consolidation. This illustrates how cooperative structures can evolve over time as member needs move from local service provision toward national and international market participation.

1. Primary Co-operative

A primary co-operative is owned directly by individual members who use the services of the co-operative. Membership is generally open to individuals sharing a common economic, social, or community interest.

Members are natural persons, and each member typically has a single vote, regardless of their capital contribution. Typical uses in Ireland include community co-operatives, where local residents collectively own assets or services, and farmer-owned agricultural co-operatives purchasing inputs or marketing produce and are historically common in dairy, livestock and horticulture sectors.

This model boasts strong, democratic member engagement driven by direct accountability between user members and those running the co-operative. However, the primary co-operative can occasionally be hindered by limited access to scale and capital.

2. Secondary/Federal Co-operative (a "Co-op of Co-ops")

A secondary or federal co-operative is owned by co-operatives rather than individual persons. It exists to provide services that those member co-operatives can achieve more efficiently together with one entity.

Members are co-operative societies, and voting rights may be equal among member co-ops or weighted according to agreed rules. Strategic control remains with participating co-operatives. Typical uses include agricultural processing and marketing, input purchasing and procurement, shared services, and advocacy and development bodies. Economies of scale.

This model can offer greater bargaining power, access to larger markets, shared expertise and professional management, reduced duplication of costs, and preservation of local autonomy while gaining collective strength. However, care needs to be taken to ensure that being a further step removed from the user-member does not diminish member control, engagement or accountability, or add an extra layer of complexity.

3. Hybrid or Mixed-Membership Co-operative

A hybrid or mixed model combines a lot of the characteristics of the preceding two models, facilitating membership from both natural persons and co-operatives (and other types of organisations in certain cases).

Membership of these co-operatives can include Individual members, co-operatives from the relevant locality and/or sector, community organisations, and other stakeholder groups.

These are typically found in the Gaeltacht sector, community and rural development. While this model offers potential for scale, co-ordination and stakeholder participation, it requires a more sophisticated structure than the other two models to ensure adequate distribution of power between the various members and preventing dominance of a single stakeholder/membership group or disengagement by a number of groups that feel disenfranchised.

3.2 Hybrid models involving co-operatives, private investors, and public entities

For the purpose of this study, we will focus on two broad legal structure types to encompass the multi-stakeholder joint venture/special purpose, and to include stakeholders from within and outside the co-operative sectors. The main consideration is addressing any possible conflicting objectives:

1. Company Structure (e.g. Designated Activity Company)
2. Secondary Co-operative co-owned by stakeholders of all categories

There are several combinations and permutations of stakeholder type and requirements and therefore the factors outlined below are merely a high-level guide to what should be considered on a case-by-case basis.

Stakeholder Requirements

Depending on the stakeholder category, there will be different priorities and objectives, for example, in the public sector, a local authority would have an interest in decarbonising their region and in creating economic activity for the area (and thereby potentially significant rates income over time). Therefore, a Local Authority may seek to protect their investment (e.g. site, equipment or cash) by way of appropriate representation or rights, but direct ROI on investment may not be a priority. A dairy co-operative may be interested in valorising side streams from processing and in having manures processed on behalf of member-farmers as well as being a customer for bio-fertiliser and perhaps biomethane (feedstock provider and market off-taker) and again may not require the SPV to be dividend-paying, as there are other financially measurable benefits. Similarly for a data centre or pharma company who is an investor and off-taker, the main benefit may be in decarbonisation rather than profit on this SPVs activities. For research and innovation actors, shareholding in an SPV will be a less likely scenario, but there may be symbiotic co-location advantages for specialist equipment which could be facilitated by alternative means.

The greater challenge is where an 'asymmetric' investor is involved and has no other benefit apart from return on a 'green' investment. Although there may be allowances for sustainable investment credentials and a risk reduction for a more consistent and whole of value chain approach, there will still be an expectation of return. Therefore, the 'Funding Stack' will impinge on governance requirements (mix of debt, equity and grant) and the

breakdown of which stakeholders contributed equity in cash or by way of site/buildings/equipment and Funder Requirements. Risk management and a fair and equitable voice for those who may not provide significant equity but on whom a steady and predictable long-term supply of feedstock depends on their fair and reasonable representation. All of this of course, will be subject to the individual stakeholder make-up and prevailing economic and regional conditions at any particular juncture. It should also be borne in mind that certain public funders attach 'not for profit' or disposal limitations as a condition of funding.

4. Governance and institutional design

4.1 Decision-making frameworks

Given the stakeholder categories outlined in section 2.4, there are a variety of objectives, and while most are complementary, some could be interpreted as conflicting. This is particularly obvious where investors take equity stakes with a (potentially) singular interest in monetary return on such investment. In that specific scenario, the very specific interests of such investor(s) would need to be appropriately catered for in the decision-making framework. In assessing how to cater for that singular investor perspective and indeed any other scenarios where the stakeholder-mix is heterogeneous, many important questions will need to be considered. These include the following:

- How are investors likely to seek protection for their investment?
- To what extent can and should certainty be afforded to investors in respect of that protection, both in terms of capital and interest?
- How can investors be fairly included in the decision making such that the input and off-take service purposes are delivered side by side with the accepted investment return deliverables. Is there to be a minimum dividend on capital invested for these investors and is that return to be guaranteed in the constitutional or contractual instruments or is it to be subject to a decision-making framework where the decision in a given year may be to not pay out a dividend?
- How can feedstock providers be fairly included in decision making when they are (a) solely feedstock providers, or (b) also market off-takers for certain products?
- How can state or semi-state agencies be included (if required) in the decision-making framework? (Example of a local authority providing a site for the facility) What might be the interests of these stakeholders viewed through a decision-making framework lens?
- How could other stakeholders be included? (E.g. research/academia, community) And what would be the conditions for a decision to include such a stakeholder be if that decision was to be left for a later time? For example, in primary agricultural co-operatives the co-operative constitution will vest the Board of Directors/ Committee of Management with the power to admit new members with some prescription on the corporate form of those potential members. The Board of Directors will then typically adopt a policy on admission and can admit a

shareholder member without further consultation with the existing membership. Co-operative conventions such as this one would need to be considered when assessing the optimal decision-making framework on establishment.

- How could these decision-making frameworks affect the cost of debt/equity and reduce or increase risk? The range of decision-making configurations does allow for a comprehensive conversation with the stakeholder mix prior to establishment and that conversation can enable information on the cost of debt / equity considerations of respective investors and stakeholders to be shared and factored into the design of a governance structure with an optimal (in terms of balancing the variety of interests involved) decision- making framework.

What are the likely mechanisms for these stakeholders and what are the pros and cons of each?

For the purposes of this report, it would not be realistic to set out and predict the entire mechanism that would optimally address the decision-making needs of every conceivable stakeholder mix. In short, the scenarios are too various and the facts too theoretical for that type of assessment. However, it is possible to speculate on some of the mechanisms that investor-stakeholders might seek in each project:

- Percentage equity stake. The norm in a co-operative is for member shareholders to have broadly similar shareholding stakes. This is not a requirement of law, but rather a function of the model which generally speaking: requires a modest initial investment; may prescribe a service use measured minimum shareholding over time; and may reward participation by service using stakeholders through the allocation of patronage bonus shares. It may be that an investor will seek a substantial minimum shareholding. If so, it should be borne in mind that where that investment would sit inside a co-operative society (as distinct from in a company part owned by a co-operative society) the convention in Ireland would be for that large shareholding to deliver no increase in voting rights for the shareholder.
- Step-in rights. An investor stakeholder may seek the right to unilaterally take action when certain specified events occur. These mechanisms feature in commerce outside of the co-operative sector often where an investment or asset ownership stake is substantially owned by a party that considers itself to be disproportionately exposed (relative to other stakeholders) to a negative investment / asset event. If for example an investor is putting forward a large financial sum to establish an

anaerobic digestion facility and is removed from the day to day operations of that facility and furthermore lacks the continual knowledge that a feedstock supplier or market off-taker might possess they may seek to mitigate that comparative weakness, as they may deem it to be, by seeking contractual rights to veto or unilaterally approve identifiable future capital expenditure decisions regarding the facility. As highlighted above, the commercial, financial and operational features of a given project will dictate the likelihood of that prospect as will the risk profile of the investor stakeholder in such a scenario.

- Board Representation. Where an enterprise is configured as a conventional primary co-operative in the agricultural sector board seats will be allocated on the basis, generally, of geographical concentration of active shareholding members with further stipulations in some co-operatives to reflect considerations such as multi-purpose member cohort representation or the integration of a recent amalgamation between two or more co-operatives. It is conceivable that an investor in a hybrid/ mixed membership entity would seek a minimum representation on the Board. Having said that, in both of these scenarios, a director's first responsibility is towards the legal entity's interests and not those of his/her nominator.
- Advisory or Technical Committees/Steering Groups. Technical working groups can be used to gather, interrogate and develop important information that can lead to important decisions. It may be that a particular stakeholder has an interest in being involved in such a working group. It may also be the case that the enterprise would benefit from the presence and input of that representative on such a working group. An important related point for stakeholder transparency: the precise mandate and decision-making powers of any such working group should be carefully considered either at the point of enterprise establishment or at the point of such a working group being established. If working groups are likely to be an active part of the enterprise's decision-making framework, then early consideration of how these should be configured is advisable.
- Direct or indirect role in the appointment of senior executives (CEO, COO, CFO). In a conventional primary co-operative, the decision of appointing the chief executive is one reserved for the Committee of Management / Board of Directors. The appointment of other executives is typically the reserve of the chief executive. It may be the case that a stakeholder with some reasoned justification seeks representation on, for example, a subcommittee that would report to the Board on

the selection of candidates for the chief executive (or COO, or CFO) position. Other permutations are of course conceivable. Where any such departure from the co-operative convention is considered, it would be prudent to consider why such a deviation is proposed and what (if any) negative consequences might arise. The co-op model, at its most basic, is one built on the premise that the service using members appoint from their peers a board of directors who in turn appoint a CEO to deliver operationally, commercially and financially on the board's strategy for meeting the needs of those service using members.

4.2 Roles and responsibilities of stakeholders

Whilst the 'quintuple helix' approach encompasses Government/semi-state/local authority, industry, research and innovation, civil society and environment. It is really the first three plus local community which are most relevant from a governance perspective. The relevant broad stakeholder categories represented for this purpose may include:

Feedstock Provider (corporate entity/co-op) - as a constituent group the primary need will be maximum return on feedstocks and/or a cost avoidance (for example a food processor currently paying a gate fee or transport fee to 'dispose' of what may now be regarded as a waste. Having a feedstock provider as a shareholder makes for a more robust feedstock supply than having feedstock supplied via supply contracts alone.

Market off-taker only – potentially a shareholder and service user, they may be a customer for biomethane, biofertiliser or other biorefinery co-products.

Combined Feedstock Provider and Market off-taker, a combination of the two aforementioned, in this case with the potential for conflicting objectives amongst the one stakeholder constituency.

Equity Partner will be looking for ROI only, though perhaps with a lower yield if 'green' credentials are of core interest to a particular funder and/or they have a say in what they regard to be protectionary measures for their own investment.

Local Authorities will have the advantage of decarbonisation in their own region, increased economic activity, high value job creation and potentially substantial commercial rates income. There is also the potential to repurpose brownfield sites under local authority control, for example decommissioned landfill sites or other post-industrial sites in public ownership. As outlined in the case of Denmark in this report, local

authorities played an important part in developing the biomethane sector when the market was nascent there through co-ownership in many cases. They later exited these structures in all cases once the market was developed and functioning. Local authorities will bring community trust as well as being 'honest brokers' in forming regional consortia of other actors as by their nature they will act within public interest.

Research-Performing Organisations (RPOs) may not seek to own commercial assets of a share thereof, but there is a strategic advantage for them (and for commercial bio-industrial projects) in a two-way 'feedback loop', to deploy innovation and to inform ongoing and future research. This could be by way of advisory committee membership or by way of bilateral agreements on research and innovation activities.

Grant Authorities, may, as a condition of funding seek an equity stake and/or impose restrictions such as not-for-profit status, restrictions on disposal of assets or operational activities which may not align with initial grant objectives or rules.

4.3 Governance hierarchy and operational oversight

The governance hierarchy will again vary from case to case and will largely depend on the stakeholder mix, their individual mandate, their individual share of equity/ownership and indeed any conditions attached to grant or loan agreements. A provider of equity, loan or grant may have minimum requirements for the number of seats they hold, voting rights, or 'step-in' rights as alluded to elsewhere in this report. This will vary on a case-by-case basis and indeed on the lifecycle stage of the entity itself. There is of course the legal requirement to have a suitably appointed and functioning board of management who carry out their statutory legal and fiduciary obligations in all cases and irrespective of the legal structure of the organisation. However, given the complexity of the stakeholder mix and related requirements of each and indeed the complex technical and R&I requirements, there are significant grounds for having a number of oversight committees additional to the board of management. Membership may of course be drawn from the board but also from suitably qualified external parties (or a mix of both) depending on experience.

An oversight structure may also consist of an advisory board which may advise at significant developmental and operational junctures. This advisory board could have thematic sub-committees and could be drawn from board members or from elsewhere. The board could meet of course on a full plenary basis but also perhaps thematically in the form of sub-committees as follows:

- **Funding and Finance** to examine and sense check financial models from the perspective of debt, equity and grants sources. External members here could be drawn from banking and finance institutes or providers of public finance to gain knowledge and expertise from the different funder perspectives. This will be especially important at key developmental milestones such as project initiation, construction, commissioning, future modular development, future joint ventures or market access.
- **Market Access** to critically examine new market opportunities in often nascent and specialist markets. Activities could include screening market opportunities and developing strategies and capabilities using specialist expertise and combining with the activities of other sub-committees in plenary meetings.
- **Infrastructure, Policy and Regulation.** Members could include utility infrastructure providers, local/regional authorities, representatives of permitting and regulatory bodies.
- **Technical and R&I.** An opportunity to link RPOs with projects to test and deploy their findings and inform future research. RPOs may not want to own commercial physical infrastructure or sit on boards but participating on a technical advisory committee could be mutually beneficial.

5. Legal and regulatory alignment

5.1 Irish co-operative legislation

In the Republic of Ireland co-operatives have traditionally been established under the 'Industrial and Industrial Provident Societies Acts'[25]. The legislation affords the established co-operative or 'society' with many of the benefits afforded to other incorporated enterprises. These benefits include the ability to enter into contracts, to employ, to purchase assets, and to limit the liability of its subscribing members. The legislation prescribes certain obligations on the society including to file annual returns and to be accountable for its debts with the prospect of dissolution and cancellation. The legislation also, it should be mentioned, contains some features that are arguably outdated and which it is anticipated will be streamlined in an anticipated reform of the legislation. A society is required to provide for certain matters in its constitution – one being the appointment of a committee of management / board of directors and this is a focal point for co-operative governance the successful design of which in ICOS experience will depend on enshrining and refining the idea of service using member control and the other features referred to herein.

5.2 Corporate governance requirements

Corporate governance is primarily concerned with ensuring that an organisation acts in a manner that accords with its stakeholders' interests and its legal and constitutional obligations. For a co-operative society, these stakeholders include what could be categorized as internal and external groups. External stakeholders would include financial institutions, statutory regulators, and the State, while internal stakeholders would include members (shareholding members) and employees.

Corporate governance will provide for the activities of the organisation to be delivered in balance and alignment with the interests of these stakeholder groups. The value of robust governance structures is clear. For example, co-operatives are required to prepare annual financial statements, subject to statutory audit, approved by the members in general meeting, and filed with the appropriate registry (the Registry of Friendly Societies).

[25] https://rfs.gov.ie/overview/industrial-and-provident-societies/

This process enables members and external stakeholders to identify early warning indicators regarding the organisation's financial position. If such issues are not addressed, they may ultimately threaten the organisation's ability to continue as a going concern and, in turn, its capacity to deliver essential services to stakeholders.

In constructing the co-operative's corporate governance requirements, a number of core elements should be considered.

Alignment with Objects

The co-operative must act in accordance with its registered objects, as set out in its rules. These define the core purpose for which the co-operative was established (for example, to operate an anaerobic digestion facility) and typically allow for development into ancillary or related services over time.

The rules also provide the ancillary and operational powers required for the co-operative society to function effectively. These include the ability to engage with financial institutions, acquire and dispose of assets, and employ personnel necessary to carry out the co-operative society's authorised activities.

Reporting and Member Communication

Effective reporting is a central component of governance, particularly in relation to members who both utilise the organisation's services and have a direct interest in its success. In a co-operative, the governance structure should ensure that service using members are kept appropriately informed of performance and progress through formal mechanisms.

The Annual General Meeting (AGM) is a key pillar of governance from a member perspective. The co-operative's constitution will prescribe the matters to be addressed at the AGM, along with the rights of members with regard to determinations on those matters. This structure supports transparency, accountability, and effective member oversight.

Voting Structures and Member Control

Member control is a defining principle of the cooperative model. Co-operatives can be described as economic democracies, typically operating on the basis of "one member, one vote" as provided for in the co-operative's constitution. The motivation being that service users retain primacy in decision-making, irrespective of differing levels of their participation.

In certain circumstances, limited modifications to this principle may be appropriate. For example, differences in voting rights may arise where a member's reduction in activity becomes permanent, or where distinct classes of membership engage with the cooperative in materially different ways. Any such arrangements should be clearly set out in the establishment documentation and applied transparently to maintain fairness across the membership.

Member Rights and Governance Mechanisms

A well-designed governance framework provides members, and, where appropriate, other stakeholders, with defined rights in relation to the operation of the society. These rights underpin accountability and enable active participation in governance.

They typically include the right to elect a board (or committee of management) responsible for overseeing the affairs of the co-operative society; the right to requisition a special general meeting in accordance with the co-operative's constitution and applicable legislation; and the right to remove committee members or directors where there are legitimate concerns regarding performance or governance.

5.3 Alignment with EU and national funding frameworks (including JTF)

Although Governance structures are not directly affected by or do not in turn directly affect EU and national policy instruments, there are some pertinent links and issues common to many such funds which can present as potential enablers or barriers. These may necessitate certain structural design requirements of a jointly held special purpose vehicle or joint venture company or indeed secondary co-operative.

In terms of one overarching theme, State Aid and De Minimis rules tend to surface quite often when examining funding frameworks. State Aid[26] referring to rules governing public funds received by a commercial organisation and De Minimis being the maximum allowable threshold for key supports over a rolling three-year period. The latter is capped at a modest €300,000 and can present a challenge in two ways, firstly this can be for services delivered 'in kind' by a funded cluster service-provider. This means that an organisation who needs the services of a funded cluster subject to De Minimis rules can only accept these services to the equivalent value of their available De Minimis 'balance' (taken from their €300,000 rolling 3-year allowance). Secondly, if a commercial organisation receives direct financial support by way of grant aid subject to De Minimis then it is subject to the same cap. This can prove challenging in many circumstances, but most especially at the early stages of consortium forming where feasibility or priming

study funding is required and could discourage participation of a stakeholder in a collborative opportunity. It may prove difficult for commercial organisations to get internal approval to self-fund feasibility investigations for a collaborative venture with third parties, especially as a proposed biorefinery project would require significant scoping from an engineering/design and financial and business modelling perspective. This early-stage barrier could influence consortium formation and the need for flexibility in terms of who could leave or join as a project progresses from concept to detailed feasibility/priming to a bankable proposal. For industrial projects, the front-end development expenditure required to get a project investment-ready is well established at 2-5% of total installed cost, so for a €25m project, this effectively 'priming' phase would cost upwards of €500,000.[27]

Other possible funding limitations which have been encountered include 'not for profit' designation which could limit equity partner opportunities and project viability in some cases. Limitations on the disposal of assets is a conditional clause of some funds which also may deter some stakeholder groupings.

Some funding instruments are designed with almost every type of company structure in mind but may not have flexibility in allowing for the recognition of co-operative structure in their funding applications. This may inhibit co-operative participation in some cases.

While spend on research as a percentage of GDP may lag behind Ireland's European contemporaries, (1.38% in Irl vs 2.24% of GDP EU average in 2024 – see table 2), spending in Bioeconomy research has been very targeted yet could benefit from increased funding and indeed funding towards commercialisation (post pilot/demonstration).

[26] https://enterprise.gov.ie/en/what-we-do/eu-internal-market/eu-state-aid-rules/

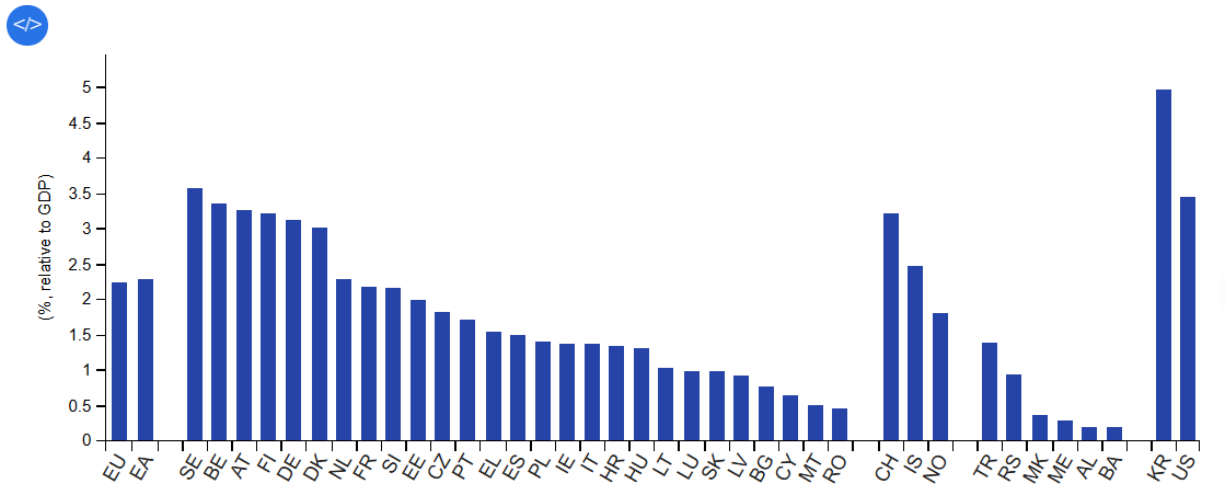
[27]Construction Industry Institute (2012) - front-end planning typically 2-5% of total installed cost.

[27]Merrow, E.W. (2011), *Industrial Megaprojects: Concepts, Strategies, and Practices for Success*, Wiley - getting a project investment-ready costs c. 2.5-5.5% of total capital cost.

[27]National Research Council (2001), *Progress in Improving Project Management at the Department of Energy: 2001 Assessment*, National Academies Press, p.30 - mean front-end planning spend of 4.3% for industrial projects.

Table 2 Source: Eurostat

Gross domestic expenditure on research and development, 2024



EU Bioeconomy Strategy

The EU Bioeconomy Strategy (Nov 2025)[28] is a landmark document in setting the policy support landscape for what will likely be the most impactful period to date in terms of commercialisation opportunity within the bioeconomy. The strategy highlights the dual 'valleys of death' in bringing bioeconomy-led commercial developments to full fruition. The first being at the pre-commercial stage and much investment has been made in pilot and demonstration initiatives in recent years to address this.

The second 'valley of death' referred to in the strategy *"arises after initial market entry, when companies seek to scale up to industrial production. Here, the challenge is moving to industrial scale, requiring substantial growth capital and long-term offtake certainty."*

The Bioeconomy Strategy references other EU Strategies, those being for European Life Sciences and the EU Start-up and Scale-up Strategy which, they say will *"provide the framework to accelerate innovation, improve market access and support scale-up, ensuring that sustainability and competitiveness advance together."* The strategy also states that these should be complemented by *"a number of measures specifically targeted at investment and innovation in the bioeconomy, focussing particularly on the later stages of the scale up journey."*

[28] https://environment.ec.europa.eu/strategy/bioeconomy-strategy_en

There is also recognition of the need for certainty around deploying capital and de-risking investments to scale up innovation, especially in reducing investment risks, mobilising blended finance, and to "*strengthen the financial viability of breakthrough solutions.*" There is also recognition of the impact of state aid rules and the need for targeted instrument design with SME needs in mind and a "*specific focus on attracting bioeconomy-focused investors and impact-driven funds that can support long-term, capital-heavy projects, in line with applicable State Aid rules.*"

The document describes the Commission proposal for the next Multiannual Financial Framework (MFF 2028-2034)[29] as "*increasing the funding for the bioeconomy through the European Competitiveness Fund (ECF)[30], and the Horizon Europe Framework Programme policy window on health, biotech, agriculture, and the bioeconomy.*" Although this is a positive quotation if taken in isolation, it does mask a more competitive environment for bioeconomy initiatives than previous dedicated funds under Horizon Europe in particular. Whilst a 'one health' approach may make sense to group together with agriculture, biotech and the bioeconomy, an aging population across Europe will mean an increased health spend and therefore further pressure on this funding allocation.

Recommendations from the EIB Group are also referenced, these include "*developing a bioeconomy booster programme, leveraging the Circular Bio-Based Europe Joint Undertaking (CBE-JU) flagship grant applications, and increasing flexibility in project support*". The leveraging of the CBEJU flagship programmes offers great potential as does the highly relevant flexibility in project support. What is concerning however, is the mention of Common Agricultural Policy (CAP) in the context of offering: "*various models for cooperative investments in bottom-up processing and marketing of new value chains, creating value from untapped biomass, and in bridging primary production with industrial investments, thereby contributing to rural growth and employment.*" Whilst the measures outlined are absolutely necessary, it is unlikely that CAP funding will achieve significant impact in light of the well publicised cuts to the next round of CAP funds[31].

[29] https://www.europarl.europa.eu/factsheets/en/sheet/29/multiannual-financial-framework

[30] https://single-market-economy.ec.europa.eu/access-finance/european-competitiveness-fund_en

[31] https://agriculture.ec.europa.eu/common-agricultural-policy/cap-post-2027-next-eu-budget_en

Other very positive and welcome measures include the Commission working to *"improve access to finance and related services for startups and scale-ups in the bioeconomy via the Scale-up Europe Fund and other European Innovation Council instruments*". There are also references to the Commission working 'with industry and stakeholders to review the CBE-JU' and to 'determine the most effective collaboration format for the next MFF, ensuring impact and value for money'.

In an effort to attract private investors, the Commission says that it "*will identify financial tools to build on successful practices such as the European Circular Bioeconomy Fund (ECBF), through the EIB, and national promotional banks."*

There is also a commitment to convene a 'Bioeconomy Investment Deployment Group', focusing on finance and investment. This will combine research, demonstration and crucially scale-up financing across EU and national levels. The investment deployment group will comprise of the Commission, the EIB Group, national promotional banks and private investors and has the objective of creating a 'pipeline of bankable projects'. This strategic and coordinated approach is intended to help mobilise public and private investment, and specifically targets 'first-of-a-kind biorefineries, advanced fermentation facilities and bio-based materials manufacturing.'

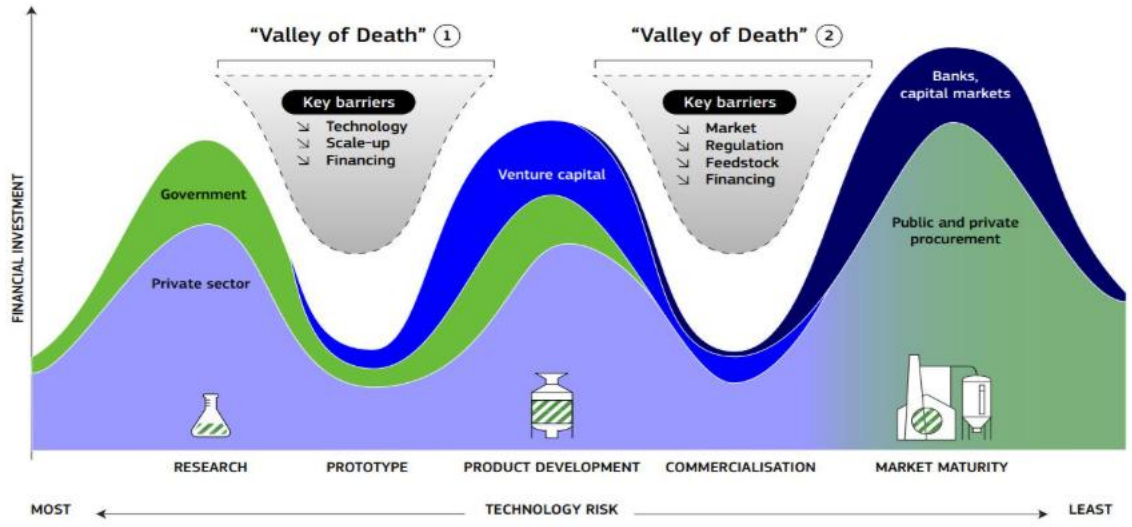
Important Projects of Common European Interest (or IPCEIs)[32] are noteworthy. The Bioeconomy Strategy states that the Joint European Forum for IPCEI (JEF-IPCEI) is actively examining the biotechnology and biomanufacturing value chain to identify potential projects. Under IPCEI, Member States are permitted to design aid measures to support approved projects for research and development of *"major innovation and the first industrial deployment of technologies crucial for the clean transition, or important infrastructure projects."*

Finally, strategic regional approaches will be prioritised, especially the use of blended-finance instruments to accelerate first-of-a-kind biorefineries and will strengthen de-risking approaches to attract more private capital. "***To support the emergence of strong regional clusters, the Commission will facilitate the development of Industrial Symbiosis Valleys that coordinate feedstocks, infrastructure and investment planning at territorial level.***"

[32] https://competition-policy.ec.europa.eu/state-aid/ipcei_en

The latter in particular bodes well for the development of multi-actor regional biorefineries at scale, provided appropriate support instruments can be deployed.

Table 3 Source: EU Bioeconomy Strategy 2025



Source: European Commission graph based on the public consultation results and own analysis

Pilot and Demonstration Facilities (JTF)

The clear role of Pilot and Demonstration facilities has been reflected in the increase in the level of support in recent years. Nowhere has this been more obvious than the deployment of the Bioeconomy Demonstration Initiative Scheme, funded under the EU and Irish Government co-funded 'Just Transition' fund. To date, two calls have been held. According to a joint DAFM and DCEE press release, the call is designed to *"deliver practical, investable bioeconomy solutions in Ireland's Just Transition Fund Territory in the Midlands, which supports communities and businesses to build new, low-carbon biobased value chains as the region moves away from peat."*[33]

In 2026, €10 million in funding for two bioeconomy demonstration initiatives was announced. Both projects will base the demonstration activity, biomass procurement and industry collaboration in the Midlands 'Just Transition' region.

€5 million was awarded to the 'BIOCHAR'[34] project led by University of Limerick while a further €5 million was awarded to 'TRANSFORM'[35], led by University College Dublin.

The BIOCHAR project will demonstrate the potential uses of biochar in agriculture, bioenergy and sustainability and will also develop a 'high-level blueprint for a mid-sized biochar facility to support future investment and replication in the Midlands.' The TRANSFORM project will be transforming agri-food byproducts and waste into functional ingredients. This €10m announcement will build on the €22 million already committed to other bioeconomy pilot projects.

These projects offer the opportunity to bridge the gap between lab and pre-commercial, to practically demonstrate what can be done – not only from a technical viability perspective but from an economic feasibility standpoint also and give greater confidence to industry and finance decision-makers.

At the time of writing, a €9.7 million investment was announced by Government, to pilot and demonstration projects based at the National Bioeconomy Campus[36] in Lisheen, Co. Tipperary. These are the 'BioScaleUp' Bioeconomy Demonstration Initiative and the National Biorefinery Pilot Plant (NBPP)[37].

The €4.7million National Biorefinery Pilot Plant was officially opened in late June 2026. Minister Martin Heydon commented at the launch saying *"these facilities will help take agricultural, food, forestry and other biobased side streams, often seen as waste and turns them into new valuable products for sectors as diverse as food ingredients, bio-packaging and bioenergy. The infrastructure being funded here by government and the EU gives researchers, SMEs and industry access to the equipment and expertise they need to test, validate and scale new biobased products and processes. This is about turning good ideas into real products, new value chains and new opportunities for rural and regional Ireland."*

The BioScaleUp Bioeconomy Demonstration Initiative is co-funded through the Government of Ireland and the European Union through the EU Just Transition Fund. With €5m in funding, it will demonstrate and scale six innovative biobased technologies at the National Biorefinery Pilot Plant. According to the DAFM project launch release, the project will show how renewable biological resources, residues and side streams can be converted into higher-value products. These will include food and feed ingredients, proteins and bioactive compounds, natural colours, aromas and flavours, peptides, amino acid ingredients, green chemical inputs for bioplastics and textiles, biomaterials, biomethane and other renewable energy applications. This project will assist potential developers of large-scale facilities to assess the options available to them in selecting the approptiate

technologies and processes to maximise output particular to regional circumstances. It will also assist in bridging the gap between R&I and industry and finance actors.

Circular Bio-based Europe Joint Undertaking (CBE JU)

The Circular Bio-based Europe Joint Undertaking or CBE JU[38] is a €2 billion public-private partnership between the European Commission and the Bio-based Industries Consortium (BIC). It was established under the EU Horizon Europe research programme to fund research and innovation projects that advance competitive, sustainable, and circular bio-based industries in Europe. CBE JU is dedicated to mobilising laboratory research and commercial-scale industrial deployment.

CBEJU Core Goals

- Accelerate the innovation process and development of bio-based innovative solutions.
- Accelerate market deployment of the existing mature and innovative bio-based solutions.
- Ensure a high level of environmental performance of bio-based industrial systems.

CBE JU provides funding through annual calls for innovation proposals from basic research to large-scale flagship operations.

The main actions funded through CBE JU include:

Research and Innovation Actions (RIA): Establishing new knowledge or exploring feasibility for new technologies.

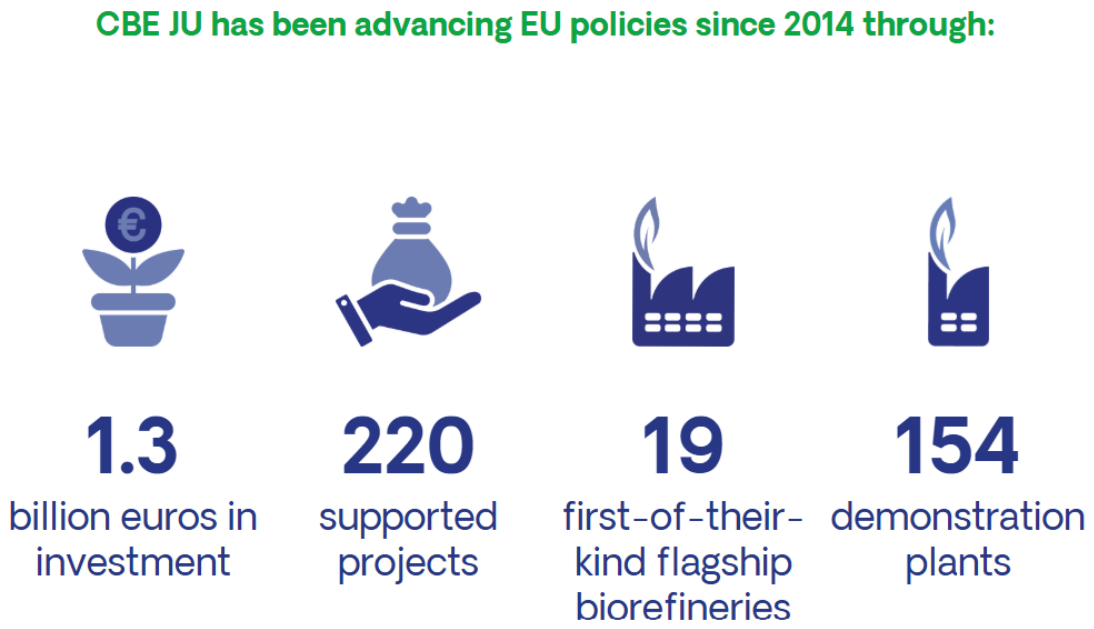
Flagship Actions: Supporting the first commercial-scale versions of new bio-based facilities.

Coordination and Support Actions (CSA): Networking, standardizing, and establishing policies.

CBE JU has funded 19 flagship projects and 154 demonstration plants since 2014 but had identified a gap in primary producer engagement and commissioned a study to investigate how best to address the deficit. This resulted in the creation of a CSA-supported working group for primary producer engagement in the bioeconomy[39] and with CBE JU projects in 2025. The working group is chaired by John Brosnan, co-author of this report and seeks to strengthen links with both primary producers and especially with the co-operatives and producer groups. This reflects the vital role that primary producers

in agriculture, forestry and marine/fisheries/aquaculture play in powering the bioeconomy through feedstock generation and provision.

Table 4 Source: CBE JU



[33] https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/2025-eu-just-transition-fund-bioeconomy-demonstration-initiative-call-2/

[34] https://biocharjtf.com/partner/university-of-limerick/

[35] https://www.ucd.ie/agfood/newsandevents/news/recentnews2026/transformprojectawarded5millioninfundingthroughtheeu/

[36] https://bioeconomyfoundation.com/

[37] https://nbpp.ie/

[38] https://www.cbe.europa.eu/

[39] https://www.cbe.europa.eu/

Domestic Biomethane Supports

'The Biomethane Development Office'[40] is an initiative of Biomethane for Carbon and Community (BCC)[41] which is led by Tipperary County Council (TCC) and supported by key partners including Technological University of the Shannon (TUS), Irish Bioeconomy Foundation (IBF), Tipperary Energy Agency (TEA). The project is a key enabler for the deployment of knowledge, capacity and infrastructure to support the development of sustainable biomethane production in Tipperary and it's hinterland. The project is funded under the Just Transition Fund Programme 2021–2027, with support from EMRA and Pobal. A project team comprising of six staff from across the project partners, operate out of the Biomethane Development Office (BDO) within the National Bioeconomy Campus in Lisheen, County Tipperary.

A repository of resources[42] compiled by the BDO is available online and has demonstrated that there are many examples of EU member states who now have mature biomethane markets as a result of deliberate policy and support mechanisms. Of particular note is the 'Biomethane & Bioeconomy Synergies Report' which outlines learnings from EU frontrunners.

Ireland has lagged behind other EU member states in developing a biomethane sector and while there have been some developments, primarily as a waste treatment process inside food processing or wastewater treatment plant facilities, there have been few standalone commercial scale biomethane projects until recently. Some more recent commercial propositions have been food-waste based whilst others have relied on off-take agreements from pharmaceutical or data centre companies. The first major and concerted move to support biomethane development in Ireland came under the 'National Biomethane Strategy' capital support scheme'[43]. Funded under RePower EU, this scheme was timebound by the funding instrument to 2024/25 and offered 20% capital grant support to eligible new build and upgrade biomethane facilities up to a maximum of €5m in total support. A successor scheme is due to open in late 2026[44] and will again offer capital supports only.

In parallel, a 'Renewable Heat Obligation' mechanism or RHO[45] has been under consideration and latterly design and consultation for 2-3 years. It is modelled on the transport obligation scheme (RTFO) and means that those placing heat fuels on the market will be obligated to purchase a minimum percentage of biofuel based on their

total sales volumes. This percentage will rise over time but will begin at 1.5% in year 1, rising to 3% in year 2 with further increases expected to follow. The obligation can be met by means of certificate purchase, meaning a new market for 'RHO' certificates, creating a theoretical higher floor on biomethane prices. A 'multiplier' instrument was set to make the purchase of indigenous Irish certificates more attractive, however this was ruled out by the EU Commission on the basis of non-alignment with single market principles. Although the RHO should have a positive effect on biomethane market returns and a 'buyout' equivalent of €288/KWh (28.8c/kwh) has been provisionally indicated in the event that certificates cannot be secured. This scenario makes for much greater uncertainty than the feed-in tariff model adopted by other member states when their biomethane sectors were at an early stage of development as is the case in Ireland today. Even in 2026, there are examples of alternative approaches to creating greater market certainty, such as in Czechia, where a €3.7bn fund has been announced for a 15-year two-way 'contracts for difference' model under the 'Clean Industrial Deal State Aid Framework'[46]

[40] https://biomethanedevelopmentoffice.ie/

[41] https://tus.ie/rdi/research/institutes/sdri/climate-action/bcc/

[42] https://biomethanedevelopmentoffice.ie/resources/

[43]https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/press-releases/minister-heydon-announces-biomethane-capital-grant-payments-to-issue/

[44]https://www.gov.ie/en/department-of-climate-energy-and-the-environment/policy-information/biomethane/#national-biomethane-strategy

[45]https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/renewable-heat-obligation/

[46]https://ec.europa.eu/commission/presscorner/detail/es/ip_26_1611

6. Recommendations

- **Adequate Priming Support** for regional scale collaborative biorefinery development with mandated collaboration for consortiums which should include primary producers and their co-operatives, more than one industry partner, ideally with off-take capability and a research and innovation/RPO partner. This instrument should be deployed on a case by case but follow a consistent approach and ideally be administered by a bespoke agency on a 'shared services' basis. Priming should be 100% funded provided that consortia can meet certain requirements/thresholds around collaboration and impact. As stated elsewhere in this report, the industry benchmark of 2-5% of capex to take a project from concept to a bankable stage of front end engineering design and financial and business modelling. This means for a €30m project, the funds required are in the region of €600,000 to €1,500,000. Considering the research, pilot and demonstration funding deployed in Ireland in recent years of over €40m[47], a sum of €2.4m to €6m to prime 4 regional pathfinder bio-industrial parks would seem proportionate to commercialise and leverage this research investment through pathfinder or 'first of a kind' biorefinery projects.

  Recommended next steps: To be explored in the finalisation and implementation of Irelands National Bioeconomy Strategy 2026-30 by the lead Government Departments, the Department of Agriculture, Food and the Marine and the Department of Climate, Energy and the Environment.
- **Design and Fund a Shared Services Platform** to administer priming grants, curate specialist services, consortium forming, manage potential projects from ideation to 'bankable', operational service provision. Investigate the ReScoop and Comhar BIA models further in designing this service and long-term industry co-funding beyond priming grants and related activities.

  Recommended next Steps: ICOS, Climate KIC and partners to work on designing this platform (funding dependent).
- **Creating a Deployment or Expert Group** to expressly overcome some of the commercialisation barriers such as commercial horizon scanning and consortia formation, WGPP, access to key risk reducing expertise, taking a

biorefinery/beyond energy view, considering industrial symbiosis through co-location and multi-actor co-ownership, access to capital, community engagement, policy and regulatory recommendations. Special focus on the recommendations of the CBE JU Working Group for Primary Producers action plan and the crticial factors to consider (a) at formation, (b) operationally and (c) partner entry/exit options in a collaborative SPV model. To assess the appropriate scale and distribution of conversion technologies. For example, assessing the viability of farmer-controlled nutrient 'hubs' for efficiency and greater buy-in.

Recommended next Steps: to develop a deployment group of public and private stakeholders either allied to a shared services platform or as a successor to the Bioeconomy Forum.[48]

- **Encouragement of scale, and co-location with complementary technologies** on regional 'bio-industrial parks' to reduce the risk and uncertainty associated with an 'energy-only' or 'energy-first' approach and 'first of a kind' regional projects of impact.

  Recommended Next Steps: Integrate a progressive funding model for projects with measurable and demonstrable additional impact through scale and collaboration.
- **More detailed and in-depth analysis of European case studies** – especially why co-operative structure was employed in full ownership initially yet now appears to have evolved into a multi-stakeholder model. The evolutionary role of local authorities in the development of regional biorefineries and Eco-industrial/bio-industrial parks and the later pathway to exit as markets matured as was evident in Denmark for instance.

  Recommended Next Steps: a deliberate and in-depth study of EU models to include at minimum detailed interviews and questionnaires, perhaps with limited site visits.
- **Assess the awareness, willingness and barriers/enablers** amongst key Irish stakeholders.

  Recommended Next Steps: Detailed questionnaires and interviews with all stakeholders in the 'Quintuple helix'. Interview key personnel across industry, the public sector, research, community representatives, with special emphasis on public and private funding institutes
- **Further in-depth legal research into Irish company law and structures** which would enable meaningful and resilient multi-stakeholder participation. As primary

producers and their co-operatives will be essential to feedstock mobilisation at scale, they must be facilitated in having an ownership stake and fair representation without the requirement for prohibitive upfront captial investment. Structures which will allow for efficient deployment of research and innovation beyond the pilot/demo scale and local community engagement are vital. As this report outlines, each case will differ, therefore significant investigation will be required from a legal and governance perspective due to the nascency of the biomethane sector in Ireland, the complexity of stakeholder needs, and a rapidly evolving bioeconomy.

Recommended next steps: a funded study to involve legal experts and industry/sector-specific legal practitioners.

- **Recognition of co-operative structure** in funding mechanisms and for developers to consider why and how new co-operatives could/should be formed and involved.

  Recommended next steps: to ensure that co-operative structure and registration numbers are accepted when applying for funding supports. To recognize and acknowledge the unique nature of co-operative boards and to design application documentation and evaluation guides accordingly. The 'co-op establishment questions' (see appendix) should guide those in considering new co-operative formation. ICOS can assist in advising and facilitating this process.
- **Policy to consider the legal and financial requirements** of consortium building for regional bio-industrial projects – for example the requirement to establish a legal structure such as a Designated Activity Company at an early feasibility stage and restrictions around state aid and De Minimis requirements which may also stifle early-stage collaboration.

[47] https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/bioeconomy-research/

[48] https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/bioeconomy-research/

7. Conclusions

The development of a viable biomethane sector in Ireland is not solely a technological or financial challenge; it is fundamentally a governance challenge. While significant feedstock resources and policy ambitions exist, the fragmented nature of feedstock supply, evolving regulatory environment, and complexity of emerging bioeconomy value chains require governance structures capable of aligning multiple stakeholder interests over the long term.

This report finds that co-operative structures, either operating independently or as part of broader multi-stakeholder special purpose vehicles and joint ventures, are particularly well suited to the Irish context. Their proven ability to aggregate dispersed primary producers, deliver democratic governance, foster trust, and retain value within local communities provides a strong foundation for biomethane and wider biorefinery development.

Evidence from Ireland and other European jurisdictions suggests that long-term project success is strengthened when feedstock providers have a meaningful role in ownership and governance rather than participating solely through commercial supply agreements. Similarly, the inclusion of market off-takers, finance providers, local authorities, and research organisations can improve risk allocation, project resilience, market certainty, innovation uptake, and access to capital.

The report also highlights that governance structures must be designed deliberately from the outset. Stakeholder objectives may be complementary in many cases but can also diverge. Effective governance frameworks must therefore address issues such as representation, voting rights, investor protection, decision-making authority, board composition, entry and exit mechanisms, and the allocation of benefits across different stakeholder groups.

International experience demonstrates that ownership and governance arrangements evolve as sectors mature. Ireland therefore has the opportunity to learn from these experiences and establish governance models that are flexible enough to adapt to future market developments while retaining the benefits of local participation and stakeholder alignment.

A recurring theme throughout this report is the need to move beyond an "energy-only" perspective. The strongest opportunities are likely to emerge from integrated bio-industrial developments that combine biomethane production with complementary technologies, bio-based products, nutrient recovery, carbon management, and industrial symbiosis. Realising these opportunities will require collaborative structures capable of coordinating stakeholders across entire value chains.

Finally, the report concludes that policy makers, funding bodies and industry stakeholders should place greater emphasis on the governance and organisational dimensions of biomethane development. Appropriate priming supports, shared-service approaches, consortium-building mechanisms, and recognition of co-operative participation within funding frameworks will be critical enablers of success.

If Ireland is to achieve its biomethane and broader bioeconomy ambitions, governance structures must be regarded not as an administrative consideration but as a strategic enabler. Well-designed, co-operative-centred, multi-stakeholder governance models have the potential to deliver secure feedstock supply, stronger community support, enhanced investment confidence, and lasting regional economic benefits while underpinning the transition to a more circular and resilient bioeconomy.

8. Resources

https://www.cso.ie/en/releasesandpublications/ep/p-clsjp/cropsandlivestockprovisionaljune2025/

https://www.ibec.ie/connect-and-learn/industries/food-and-drink/food-drink-ireland/poultry-association

https://informbioproject.ie/project-outputs/ (InformBio project database)

2025-11-10_briefing-paper-co-operative-societies-bill-2022_en (1) 1.pdf

good-practice-guide-renewable-energy-communities-ireland (1) 1.pdf

Community-renewables-toolkit-financing (1) 1.pdf

nsec_energy_communities (1) 1.pdf

CELEX_02018L2001-20240716_EN_TXT (1) 1.pdf

Assessment-of-Cost-and-Benefits-of-Biogas-and-Biomethane-in-Ireland (2) (1) 1.pdf

national-biomethane-strategy (2) 1.pdf

RDD_RebioGen (1) 1.pdf

IEA environmental-sustainability_web (1) 1.pdf

BIOGAS_FoodBioClusterDenmark_English_light (1) 1.pdf

ISABEL Project - Social Innovation and Community-Based Biogas Models (1) 1.pdf

Communities matter- Institutional preconditions for community renewable energy (1) 1.pdf

CAVALE is a French cooperative winery distillery- case study (1) 1.pdf

https://www.emc2.coop/nos-activites/energie/

https://lemvigbiogas.com/GB.htm

chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://task37.ieabioenergy.com/wp-content/uploads/sites/32/2022/03/Success_Story_Ribe2012.pdf

https://bioenergyinternational.com/everfuel-launches-holstebro-hydrogen-hub-plans/

https://ec.europa.eu/eurostat/statistics-explained/index.php?title=R%26D_expenditure

9. Appendices

Resource Bank – Co-operative Establishment Questions

Purpose
1. What would the proposed Co-op do under the following three headings?
Economic:
Social:

Cultural:

Benefit				
2. How many members would the proposed co-op have?			Approx.	
3. Who would the proposed co-op operate for the benefit of? (select all that apply)				
Suppliers *Yes / No*	Shareholders *Yes / No*	Customers *Yes / No*	Community *Yes / No*	The State *Yes / No*
4. How would these people/businesses benefit?				
Beneficiaries		**Benefits**		
Name/ Describe <u>Suppliers</u>		Product		
		Service		
		Financial/Other		
Name/ Describe <u>Shareholders</u>		Product		
		Service		
		Financial/Other		
Name/		Product		

Describe Customers		Service
		Financial/Other
Name/ Describe Communities		Product
		Service
		Financial/Other
Name/ Describe State Entities		Product
		Service
		Financial/Other

Ownership

5. Who would own shares in the proposed co-op?

Suppliers	Shareholders	Customers	Community	The State
Yes / No	*Yes / No*	*Yes / No*	*Yes / No*	*Yes / No*

6. Who would fund the proposed co-op?

Suppliers	Shareholders	Customers	Community	The State
Yes / No	*Yes / No*	*Yes / No*	*Yes / No*	*Yes / No*

7. How much € capital would they contribute?

Suppliers	Shareholders	Customers	Community	The State
€	€	€	€	€

8. What % of capital would they contribute?

Suppliers	Shareholders	Customers	Community	The State
%	%	%	%	%

9. List any people or businesses that intend to contribute more than 10% of the proposed co-op's capital and/or more than €50,000:

Name	€	%

Control				
10. Who would control the proposed co-op?				
Suppliers Yes / No	Shareholders *Yes / No*	Customers Yes / No	Community Yes / No	The State Yes / No

11. What voting rights would they have?				
Suppliers		Give details:	Vote to elect directors:	Yes / No
Full voting rights			Directly appoint one or more directors:	Yes / No
Limited voting			Vote on special resolutions:	Yes / No
			Vote on amendments of rules:	Yes / No
			Attend and vote at the Annual General Meeting:	Yes / No
			Hold a controlling vote/veto on any matter:	Yes / No
No voting rights			If Yes, describe the controlling vote/veto briefly:	
Shareholders		Give details:	Vote to elect directors:	Yes / No
Full voting rights			Directly appoint one or more directors:	Yes / No
Limited voting			Vote on special resolutions:	Yes / No
			Vote on amendments of rules:	Yes / No
			Attend and vote at the Annual General Meeting:	Yes / No
			Hold a controlling vote/veto on any matter:	Yes / No
No voting rights			If Yes, describe the controlling vote/veto briefly:	
Customers		Give details:	Vote to elect directors:	Yes / No
Full voting rights			Directly appoint one or more directors:	Yes / No
Limited voting			Vote on special resolutions:	Yes / No
			Vote on amendments of rules:	Yes / No
			Attend and vote at the Annual General Meeting:	Yes / No
			Hold a controlling vote/veto on any matter:	Yes / No
No voting rights			If Yes, describe the controlling vote/veto briefly:	
Community		Give details:	Vote to elect directors:	Yes / No
Full voting rights			Directly appoint one or more directors:	Yes / No
Limited voting			Vote on special resolutions:	Yes / No
			Vote on amendments of rules:	Yes / No
			Attend and vote at the Annual General Meeting:	Yes / No
			Hold a controlling vote/veto on any matter:	Yes / No
No voting rights			If Yes, describe the controlling vote/veto briefly:	
The State		Give details:	Vote to elect directors:	Yes / No
Full voting rights			Directly appoint one or more directors:	Yes / No
Limited voting			Vote on special resolutions:	Yes / No
			Vote on amendments of rules:	Yes / No
			Attend and vote at the Annual General Meeting:	Yes / No
			Hold a controlling vote/veto on any matter:	Yes / No
No voting rights			If Yes, describe the controlling vote/veto briefly:	

Service Users	**Beneficiaries**
Controllers	**Owners**