

BioVale Strategy

2018-2022



www.BioVale.org

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Foreword

Backed by industry, academia and policy makers, the BioVale Innovation Cluster developed and approved a vision and strategy in January 2015. The University of York won funding to develop the Cluster from the Higher Education Funding Council for England in June 2015 followed by European Regional Development funding in September of the same year.

The initiative has outperformed against a range of metrics set by its funders for research and innovation, international collaboration and establishing new businesses.

*BioVale has built **effective networks for the regional bioeconomy**. The cluster has attracted over 275 members including representatives of 181 companies and 18 academic institutions. Our regular newsletter has more than 700 subscribers from over 400 organisations and we have mediated more than 100 new business-business interactions in addition to attracting around 600 participants to workshops and networking events.*

*We have raised the **national and international profile of Yorkshire and the Humber** for instance by establishing international research collaborations with 26 research organisations and 31 companies located in 19 countries. BioVale links UK stakeholders with 400 biobased SMEs across Europe via the 3Bi intercluster. 15 SMEs have mandated us to represent them in a €3.7 billion Public-Private Partnership with the EU. Innovate UK held their 2017 Chemistry and IB Showcase 2017 in York- the first time it has been held outside London – in recognition of the region’s importance to the sector.*

*BioVale has helped attract **new business for economic development** for instance the cluster now has a network of over 30 investors specialising in different aspects of the bioeconomy. Five biobased companies have established in the region in order to engage with the local knowledge base. We have delivered intensive entrepreneurship training to 17 bioeconomy SMEs and start-ups.*

*The National Centre for Universities and Business undertook an external evaluation of the HEFCE BioVale project and were so impressed that they have developed a series of case studies exemplifying **best practice in knowledge exchange**.*

Building on these firm foundations, the cluster has revised its strategy to look forward to what it aims to achieve up to 2030. The overarching vision for the cluster still stands but there are changes to the landscape to which we need to respond. These include Brexit, new commitments to an industrial strategy and ever more recognition of the role of place in innovation to drive productivity in the economy.

Our vision

Our 2030 vision is for Yorkshire and the Humber to be an international hub for innovation in the bioeconomy and an exemplar for conversion to a circular, biobased economy. The region will be home to a highly productive, integrated and innovation-driven bioeconomy able to compete in the multi-trillion pound global markets for sustainable food, feed, chemicals, materials, consumer products and energy. Our farms will use precision agriculture to minimise inputs and will cultivate diverse crops for food and non-food markets. Agricultural products, by-products and urban waste will be processed at regional biorefineries to produce food, feed, and high-value chemicals and materials, returning carbon and nutrients to the soil. We will lead the UK's progress towards doubling GVA from the transformative bioeconomy¹.

Key indicators of progress

- **Faster time from idea to market:** Growth and development of innovative biobased industries and agricultural enterprises are fostered through streamlined access to the knowledge base as well as demonstration facilities, business support services, innovation funding and private sector investment. These companies will use science-based approaches to breeding, cultivation and processing to add value to biorenewable raw materials.
- **An ecosystem that connects the different sectors in the bioeconomy:** Effective communication and networking fosters inter-sectoral, innovation and biobased value chains that create markets for regional agriculture and industry.
- **A critical mass of skilled people:** A pool of specialist and multidisciplinary staff is developed that can carry scientific skills, entrepreneurial capabilities and wider learning between different sectors in the bioeconomy.
- **Global recognition of Yorkshire and the Humber as a place to do business in the bioeconomy:** The region establishes a reputation as an innovation hub for the global bioeconomy; regional businesses have streamlined access to international markets; biobased industries choose to invest in the region and locate near to the knowledge base and other regional assets.
- **A more sustainable industrial base for the region:** The region shifts from a linear economy founded in petrochemicals to a circular bioeconomy founded in biorenewable raw materials. attracting inward investment into productive, knowledge-based businesses sustaining high value jobs.

Why the bioeconomy?

The bioeconomy covers the production of renewable biological resources and their conversion into food, feed, biobased products and bioenergy. It offers a multibillion pound business opportunity, which is backed by governments across the globe. New markets for biobased products are creating

¹ The transformational bioeconomy comprises agriculture and fishing, forestry and logging, water and remediation activities, food products and beverages and industrial biotechnology and bioenergy www.bbsrc.ac.uk/documents/1607-evidencing-the-bioeconomy-report/

new biobased industries, driving agri-tech investment and generating significant growth and high quality jobs. Around US\$2 trillion of products in agriculture and forestry, food, bioenergy, biotechnology and green chemistry were exported worldwide in 2014, amounting to 13% of world trade, up from 10% in 2007².

Industries in the bioeconomy share technological toolkits including advanced genetics, synthetic biology and green chemistry that are key sector multipliers serving not only the diverse market sectors of the bioeconomy but also the pharmaceutical sector. There is an opportunity to accelerate growth and productivity through sharing innovation more effectively across sectors.

Why Yorkshire and the Humber?

Yorkshire and the Humber is home to 10% of the UK's bioeconomy, although it is only 6% of its area³. The region has a distinctive complement of knowledge base, industry and agriculture assets with which to capitalise on the bioeconomy. The Northern Powerhouse has looked at key industrial sectors and has highlighted chemicals, food and drink as highly productive areas in the North: these are key sectors for the bioeconomy.

World-leading knowledge base: The region hosts 11 universities including the University of York which is home to world-leading strategic research at the Centre for Novel Agricultural Products (CNAP), the Green Chemistry Centre of Excellence (GCCE), the York Environmental Sustainability Institute (YESI) and leads the N8 AgriFood project. The Biorenewables Development Centre (BDC) offers open-access scale up facilities that bridge the gap between scientific discovery and commercial exploitation and links to the UK's network of open access centres, Biopilots UK. The Universities of Leeds, Sheffield and Hull have strong capabilities in biosciences and engineering. Land-based training is offered by Askham Bryan and Bishop Burton colleges. Private sector research providers include: Fera Science, a national and international centre of excellence for interdisciplinary investigation and problem solving across the agri-food supply chain; the Stockbridge Technology Centre which has premier horticulture R&D facilities; and the Sports Turf Research Institute, the world's leading sports turf consultancy.

Agriculture, food and drink: Yorkshire and the Humber has one of the largest concentration of food and drink businesses in the UK. Nestlé's product innovation centre is in York and McCain, PepsiCo, Quorn and Mars have manufacturing sites in the region. The region has a diverse agricultural base and cultivates a complete range of UK arable and horticultural crops. This includes speciality oilseed and fibre crops, the UK's largest area of energy crops, and a wide variety of livestock. Major players such as Cargill, Syngenta, AB Agri, Frontier and Limagrain have bases in the region.

Biobased chemicals, fuels and energy: Drax, the world's largest biomass power station, has invested millions to become largely biomass fuelled plant. The region hosts Vivergo, Europe's largest manufacturer of bioethanol and Brocklesby which produces biodiesel from waste fats. Many

² Five cornerstones of a global bioeconomy. El-Chichakli et al 2016. Nature 535; pp 222-3
<http://www.nature.com/news/policy-five-cornerstones-of-a-global-bioeconomy-1.20228>

³ Analysis of the economic opportunity offered by the bioeconomy for Yorkshire and the Humber. Report by the National Non-Food Crops Centre. March 2014.

regional chemical companies are founded in biobased raw materials: for instance, Croda, a global leader in natural-based speciality chemicals has its HQ in East Yorkshire. Circa, an innovative Australian chemical manufacturer, has established a Yorkshire base to access local knowledge and expertise. West Yorkshire has many speciality chemical companies, with particular expertise in personal care and engineering.

Why BioVale?

Intersectoral connectivity: Biobased value chains are founded in raw materials sourced from agriculture, forestry and waste - this necessitates new collaborations between sectors and disciplines that do not usually interact. We need to tap the potential for re-use of technology in adjacent sectors by facilitating transfer of discoveries and **innovation** across borders between sectors in the bioeconomy. **Local connectivity** is essential to the biobased economy – often the feedstocks will be sourced locally and even when they are imported, the wastes and by-products must be dealt with locally. Therefore, linking businesses at a geographical scale that is relevant to their activities is crucial to development of the bioeconomy. The biobased economy needs a **multidisciplinary workforce**, comfortable with chemistry, biology and engineering, able to access new skills as required and moving between the academic and private sector science bases. **National and international recognition** of Yorkshire and the Humber as a place to do business in the biobased economy is needed. Supporting the growth of biobased exports and attraction of new biobased businesses will be particularly important in the context of Brexit.

To address these market failures, co-operation on engaging with the bioeconomy is needed across the economic areas of several Local Enterprise Partnerships (LEPs) including Leeds City Region; York, North Yorkshire and East Riding; Teeside and the Humber. The UK's innovation policies increasingly recognise the need to create the right institutions to bring together sectors and places. BioVale is well placed to deliver on this vision for increasing productivity and delivering economic growth.

BioVale's ambitions align well with the UK's Industrial Strategy (IS) and will contribute directly to delivery of eight of the IS key pillars.

What does BioVale do?

BioVale is an innovation cluster that supports the development and promotion of Y & H as an international hub for innovation in the bioeconomy and an exemplar for conversion to a circular biobased economy. It focuses on leveraging key regional innovation assets to deliver productivity, economic growth and environmental benefit, namely:

- value from biowastes and by-products of agri-food supply chains
- high-value chemicals and advanced fuels from plants and microbes
- smart collaboration between agri-tech and industrial biotech

BioVale acts as a 'one-stop shop' for businesses in the bioeconomy, from initial R&D through to commercial products. It brokers:

- networking and dialogue
- collaborative research, development, demonstration and innovation
- tailored training, education and exchange of skilled staff
- promoting the region's bioeconomy, trade & inward investment

BioVale key activities

Four strands of activity have been proposed, to be delivered over the next four years, which will help Yorkshire and the Humber successfully capitalise on new bioeconomy opportunities. Underpinning all of these activities is connecting stakeholders and enabling streamlined access between sectors in the bioeconomy.

Networking and dialogue

- **Special Interest Groups:** The core of BioVale networking activity will be up to four special interest groups (SIGs) composed of voluntary groups of BioVale members that share an interest in a particular aspect of the bioeconomy. Two SIGs are already active, one focused on anaerobic digestion and a second on value from unavoidable food waste. The BioVale Steering Group will guide the cluster on the next topics.
- **Investor network:** A key inhibitor of innovation in the bioeconomy is access to finance. The cluster will build its network of specialist investors through attending relevant events and educating local investors in opportunities in the bioeconomy.
- **Connecting to key stakeholders:** The cluster will actively seek out opportunities to collaborate with key stakeholders such as the Ellen MacArthur Foundation, the Knowledge Transfer Networks
- , the UK Leadership Forums (e.g. IBLF) academic networks such as the N8 universities and the networks in industrial biotechnology and bioenergy.

Collaborative research, development, demonstration & innovation (RDD&I)

- **Grand Challenges:** The BioVale Steering Group will set and monitor progress on grand challenges that have the potential to transform the bioeconomy landscape in the region.
- **Engaging businesses and academics in research, development, demonstration and innovation (RDD&I):** BioVale will actively promote RDD&I opportunities to its network of businesses and connect them to relevant academics. It will convene open innovation meetings on specific topics. It will represent UK SMEs in the Biobased Industries Consortium, seeking to engage them in successful international consortia.
- **Business support programme:** The cluster will support drafting of bids to draw down funding for business innovation support and knowledge exchange programmes and will promote these to its network.

Tailored training, education and exchange of skilled staff

- **Internship programme:** BioVale will work with local higher education institutes to deliver a programme for lodging interns and knowledge transfer partnerships (KTPs) in regional biobased businesses.
- **Entrepreneurship training:** The cluster will support development of a programme of training in entrepreneurship for early career researchers and delivery of training for new businesses in specialist techniques and entrepreneurship skills.
- **Skills gaps:** The cluster will use its network, especially its SIGs, to monitor for skills gaps and connect with stakeholders capable of addressing these gaps.

Promoting the region's bioeconomy, trade & inward investment

- **Raising the region's profile:** The cluster will promote the regions bioeconomy assets by exhibiting at relevant international conferences and trade shows, particularly reflecting the region's innovative SMEs and knowledge base. We will collaborate with the Department for International Trade in promoting the cluster internationally and seek to engage international investors in our investor network.
- **Inter-cluster agreements:** BioVale will maintain its existing relationships with European clusters, providing an ongoing conduit for innovation and trade with key European collaborators. It will seek relationships with bioeconomy clusters across the world, particularly in the USA and in developing economies.
- **Advocacy:** BioVale will actively promote the interests of the Yorkshire and Humber Bioeconomy in key policy forums e.g. through participating in development of the UK's Industrial Strategy and engaging with the Northern Powerhouse and relevant LEPs.
- **Promoting business growth space:** We will encourage businesses to expand or locate in the region with a particular focus on gathering groups of businesses that can use each other's facilities, feedstocks or by-products on to sites near to open access facilities or large bio-processing plants.

BioVale governance

BioVale's direction and focus will be guided by a Steering Group composed of bioeconomy stakeholders from industry large and small, policy makers and academia. A small team of specialists will execute the strategy and report to the Steering Group. A not-for-profit company limited by guarantee, BioVale Ltd, will be the legal entity used for the cluster's formal agreements. A range of public, private and third sector partners will deliver BioVale activities.

Resourcing BioVale activities

We will seek to maintain the BioVale Executive team through a mixture of research and economic development funding streams.

Cost item	£k
Staff	120
External services	42
Marketing	29
Premises	10
TOTAL	200

Key metrics

	Target 2022
Faster idea from idea to market	
Private sector investment in biobased innovation (£m)	5
Public investment in biobased research and innovation (£m)	10
Businesses engaged in RD&I (no.)	20
An ecosystem that connects the different sectors in the bioeconomy	
New inter-sectoral business-business relationships (no.)	200
Companies establishing a new base in Y&H (no.)	20
A critical mass of skilled people	
Deliver training to new entrepreneurs (no.)	40
New student or KTP placements in biobased industries (no.)	40
Global recognition of Y&H as a place to do business in the bioeconomy	
Policy-relevant documents that feature BioVale (no.)	8
Media articles featuring regional bioeconomy (no.)	15
Formal agreements with international clusters (no.)	4
A more sustainable industrial base for the region	
lever major investment in biobased processing (£m)	50
Jobs created or safeguarded (no.)	100
Companies exporting new goods/services (no.)	5