PROJECT FINAL REPORT

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4.1.1 Executive summary

Objectives

The aim of BERST is to take into account the bioeconomy potential and strategies of a range of different regions in Europe, and therefore to gain understanding of the possibilities and challenges related to the enhancement of biobased economies. The project also provides a support network in order to promote the development of smart specialisation strategies based on the regional bioeconomic potential.

Results

1. An online catalogue of indicators on the bioeconomy and metabase tool.

In order to facilitate the quantitative analysis of the state of the regional bioeconomy, a set of criteria and indicators on the regional bioeconomy has been identified. Subsequently, data for these indicators have been collected and stored in an online metabase tool.

2. An online catalogue of measures and instruments enabling regional bioeconomy development.

The online catalogue currently contains nearly 800 measures and instruments enabling regional bioeconomy development. The catalogue allows stakeholders to search in a targeted way for measures and instruments to support the development of the regional bioeconomy.

3. A set of narratives on the development path of the bioeconomy cluster in Good Practice and BERST regions.

A conceptual model has been designed for analysing the development path of bioeconomy clusters. By using this model in the analysis of the bioeconomy cluster in Good Practice and BERST regions, a number of enabling factors and barriers for developing bioeconomy clusters were identified.

4. An online tool for creating regional bioeconomy profile factsheets.

A regional profile provides an overview of the current state of the bioeconomy in a region, suggests lessons for developing a bioeconomy cluster, and gives recommendations for instruments and measures. These ingredients can be helpful in drafting a smart development strategy for establishing or strengthening a bioeconomy cluster in the region. The online tool can dynamically create a bioeconomy profile fact sheet.

5. A network of bioregions.

This network has been developed by the method of Community of Practice (CoP), in which policymakers, companies, cluster managers and researchers jointly explore and share experiences on the development of regional bioeconomies in Europe.

Potential impacts

The BERST project contributes to encouraging the European bioeconomy in the following ways:

- design of regional profiles fact sheets to support the valorization of the regional bioeconomy potential in EU. This regional profile factsheet can be used by all EU regions (on-line template that can be dynamically filled by in principle any region, as long as data and information is available);
- completion of regional profiles in collaboration with the regional stakeholders in the 7 BERST regions. These profiles can be used as input for further steps in developing the bioeconomy cluster by entrepreneurs, R&D actors and policy makers in the 7 BERST regions;
- a set of narratives of the development path of the bioeconomy clusters in the Good Practice regions, which provided a number of enabling factors for bioeconomy clusters. These narratives may serve as a practical guidance and source of inspiration for other regions that are willing to develop their bioeconomy potential.

4.1.2 Project context and main objectives

The utilisation of biobased natural resources can be considered to be the fundamental basis of the 'bioeconomy' as it has developed up until the present time. Sustainability in both an ecological, economic,

social and even cultural sense has been one of the features of the historical 'bio-industries' such as forestry and agriculture. Nowadays, the reference to the bioeconomy is used to define a strategic orientation for the EU economy, as seen in the European Commission (2012) publication 'Innovating for Sustainable Growth: A bioeconomy for Europe''. According to the publication, the bioeconomy 'encompasses the production of renewable biological resources and their conversion into food, feed (including fodder), biobased products and bioenergy. It includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries'.

4.1.2.1 Challenges

The implementation of the European bioeconomy occurs in a regional context under the impulsion of entrepreneurs, including farmers and foresters, and political authorities, assisted by R&D workers. The drivers behind the bioeconomy are:

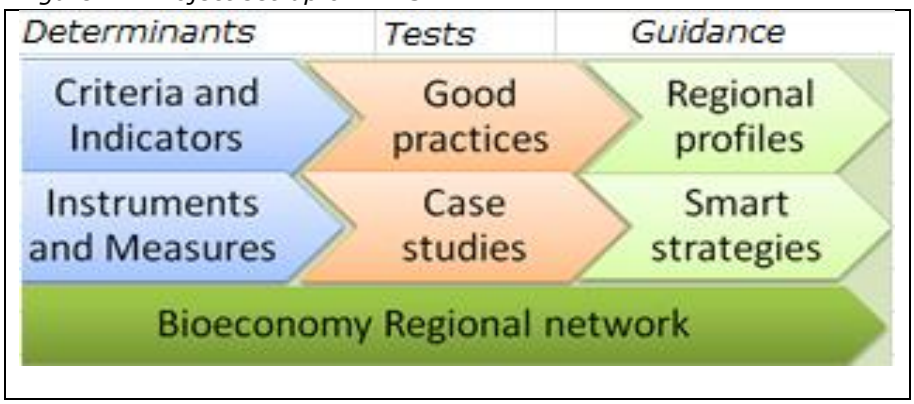
- the search for alternative resources for fossil fuels;
- the response to climate warming by reducing CO2;
- the industrial demand for new functionalities offered by biobased materials and chemicals;
- the consumer demand for biobased end-products that can compete with their fossil-based counterparts.

Regions are seeking help in finding ways to support, encourage and enhance concrete actions towards the bioeconomy, i.e. in applying strategies that give a boost to investors and to current and potential entrepreneurs within a bioeconomy.

4.1.2.2 Objectives

The aim of BERST is to take into account the bioeconomy potential and strategies of a range of different regions in Europe, and therefore to gain understanding of the possibilities and challenges related to the enhancement of biobased economies. The project also provides a support network in order to promote the development of smart specialisation strategies based on the regional bioeconomic potential. Figure 4.1 depicts the project set-up.

Figure 4.1 Project set-up of BERST



In order to understand and to estimate the potentials and challenges of regional bioeconomies, the BERST project has developed regional profiles and smart strategies for bioregions, taking the performances of Good Practice regions as exemplars for their future possibilities. These regional profiles have the following objectives:

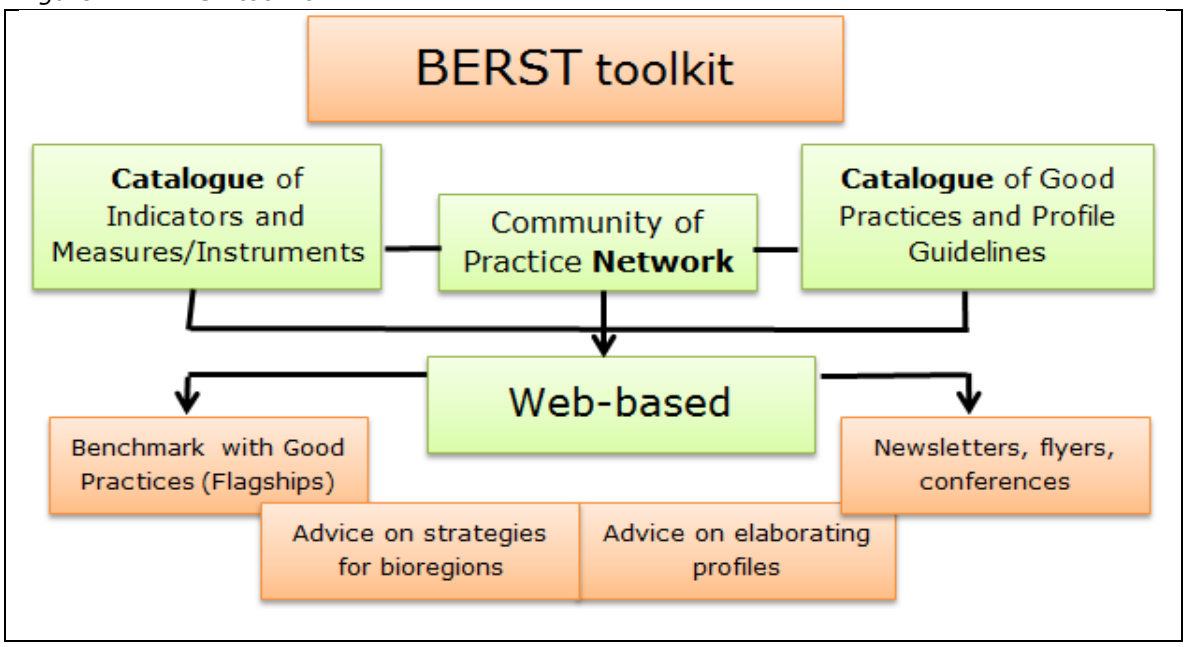
- to advise on how to enhance the bioeconomy potential;
- to promote stakeholder relations within bioregions, so that entrepreneurs can guide regional priorities in the development of the bio-economy possibilities.

In principle, all regions can be regarded as potential bioregions and can be encouraged to undertake actions to enhance their bioeconomy.

4.1.2.3 Methodology

The approach of BERST for understanding and estimating the potentials and challenges of regional bioeconomies is to provide a toolkit – with catalogues, guidelines and a network – that helps regions with their trajectory towards building a regional bioeconomy (Figure 4.2).

Figure 4.2 BERST toolkit



The project has been carried out by both research and development institutes and research-management organisations (research partners) and regional authorities and their local stakeholder groups (regional partners). The orientation of this project was as practical as possible, which means that bioeconomy companies and other relevant stakeholders have been closely involved in the project actions, through the regional partners. Their representatives have been, for example, invited to participate in relevant CoP workshops and other project events.

Research partners provided specialist knowledge whereas the regional partners provided the experience necessary to guide and validate the work of the researchers. Also, regional partners provided the lessons of their experience, or the analysis of their situation, for the benefit of other regional authorities through signalling on-going bioregional development as exemplary case studies. These case studies have been reviewed in the work programme of the project. The purpose was to show how a region or a sub-region can utilize the bioeconomy criteria, which were prepared in the project by the researcher partners in cooperation with the regional partners.

4.1.2.4 Impacts

The expected outcome for EU regions is:

- to understand their existing and potential status as a territorial platform for bioeconomy development, or a 'bioregion', and
- to chart and boost their evolution with the instruments and mechanisms suggested by the researcher partners and validated by the regional partners.

What is important in this project is that the criteria, instruments and measures to be exploited have been constructed with the regional partners. Additionally, the aim of this project is (a) to give a boost to bioeconomy industries and/or potential bioeconomy entrepreneurs and investors in the regions, by offering them relevant information about the business potential or business possibilities as well as robust and encouraging practical examples from other regions. Finally, the ambition is (b) to actively promote new

'smart' strategies for regional development through establishing an EU bioregion network. This type of cooperation highlights the interest of cooperation in the triple helix[1], in which new forms of transdisciplinary knowledge are developed.

In summary, the expected impacts of the BERST project are as follows:

- BERST addresses the need for science-based evidence and online available information for bioeconomy and bioregions.
- BERST demonstrates how a (sub) region can utilize the bioeconomy criteria, prepared by the research partners, in cooperation with regional partners.
- BERST offers tools and a support network – well aligned within the EU and with perennial status – in order to promote smart specialisation strategies of regional development based on bioeconomic potential.
- BERST contributes to the competitiveness and cohesion policies of Europe by enhancing the sustainable utilisation of regional and local biobased resources, and encouraging decision makers in their work in boosting bio-economies.

4.1.2.5 Research themes and roadmap

The research themes and roadmap of the BERST project are expressed by the following five building blocks:

1. Determining criteria and indicators

    - determining economic, environmental and social criteria related to the bioeconomy;
    - relating criteria to indicators for measuring the regional existing bioeconomy; and
    - building a criteria/indicator database based on NUTS geographic levels.

2. Determining instruments and measures

    - inventory of instruments and measures;
    - structured database with instruments and measures; and
    - alignment of instruments and measures against criteria.

3. Catalogue of good practices and case studies

    - inventory of good practices;
    - analysis of case studies; and
    - generating catalogue with good practices, as examples of experience in developing smart bioeconomy strategies.

4. Developing regional profiles

    - guidelines for regional profiles, based on criteria, instruments/measures and Good Practices;
    - elaborating and testing of regional profiles by regional partners; and
    - regional profile utility assessment: feedback of regional partners.
    -

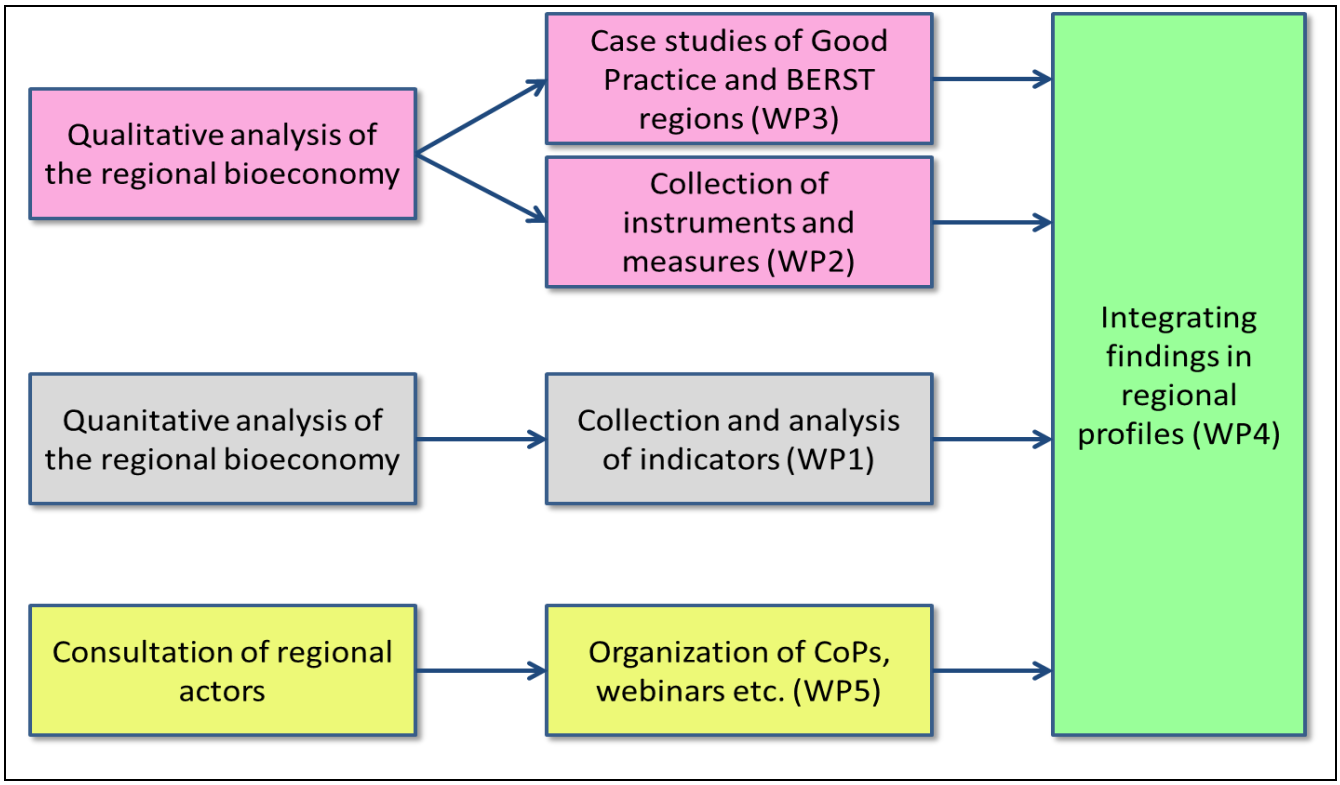
5. Establishing a bioeconomy regional network with perennial status

    - stakeholder network dedicated to regions;
    - bioeconomy development at EU level.

[1] "The Triple Helix concept comprises three basic elements: (1) a more prominent role for the university in innovation, on a par with industry and government in a knowledge-based society; (2) a movement toward collaborative relationships among these three major institutional spheres, in which innovation policy is increasingly an outcome of interaction rather than a prescription from government; (3) in addition to fulfilling their traditional functions, each institutional sphere also "takes the role of the other" performing new roles as well as their traditional function. Institutions taking non-traditional roles are viewed as a major potential source of innovation in innovation."
Source: http://www.triplehelixconference.org/the-triple-helix-concept.html

The relationship between the five building blocks is presented in Figure 4.3.

Figure 4.3 The relationship between the five building blocks in BERST



4.1.3 Description of the work performed and main results

4.1.3.1 Scientific Outcomes

The main results of the BERST project have been achieved in the following fields:

- identification of a set of economic, social and environmental criteria for the regional bioeconomy (WP1);
- design of a BERST metabase tool that facilitates the quantitative analysis of the current state of the bioeconomy in a region and its potential (WP1);
- design of an online Catalogue of Instruments & Measures enabling regional bioeconomy development (WP2);
- collecting of applied instruments and measures enabling regional bioeconomy development and filling the online Catalogue (WP2);
- comparative analysis of used instruments and measures enabling regional bioeconomy development (WP2);
- design of a conceptual model for the analysis of bioeconomy clusters (WP3);
- key findings from the Good Practices (WP3);
- barriers in developing bioeconomy clusters in the BERST regions (WP3);
- design of an online tool for creating dynamic regional bioeconomy profile factsheets (WP4);
- customized regional profiles for the seven BERST regions (WP4);
- network development activities: organization of four COP meetings (WP5);
- alignment of activities at regional, national and at EU level (WP5).

These are discussed in sections 4.1.3.2 to 4.1.3.6.

4.1.3.2 Developing a catalogue with Criteria and Indicators (WP1)

Work package 1 has undertaken a literature review to achieve a sound theoretical understanding of the nature of the bioeconomy development and to deliver an agreed set of criteria which facilitate the development of regional bioeconomy. This set of criteria and indicators has been tested in a quantitative analysis in two pilot countries (i.e. UK and the Netherlands), where data for indicators were collected and analysed for groups of bioeconomy subsectors, allowing us to quantify (in index form) the bioeconomy potential of a given NUTS3 region.

Set of economic, social and environmental criteria for the regional bioeconomy

The literature on the drivers of the regional bioeconomy can be broadly classified under the three key pillars of EU policy (Biomass Energy Europe, 2011[2]) namely:

- economy – regional development;
- society – social inclusion;
- environment – sustainability & resource efficiency.

We distinguished three levels of importance in our selected list of criteria and indicators of the regional bioeconomy (Table 4.1):

- *essential* criteria, without which it would not be possible to develop bioeconomy;
- *key* criteria, which play a very significant role in development; and
- *desirable* criteria, which can facilitate additional growth (sometimes in specific subsectors of the bioeconomy only), but which are not necessary for the development of bioeconomy.

[2] Biomass Energy Europe (2011), 'Final Report (BEE to European Commission)'.

Table 4.1 Summary of criteria and importance ranking

Criteria	Characteristics	Market model driver	Importance of criteria		
			Essential	Key	Desirable
Environmental criteria					
Biomass availability	Resource availability	Natural resources	✓		
Domestic production of biomass	Resource availability	Natural resources			✓
Land use	Resource availability	Natural resources		✓	
Infrastructure	Infrastructure	Capital	✓	✓	
Economic criteria					
Cluster size	Clusters	Innovation			✓
Cluster management	Clusters	Innovation		✓	
Cluster governance	Clusters	Innovation		✓	
Commercialisation of innovative technologies	Innovation	Innovation		✓	
Diffusion of technology	Innovation	Innovation		✓	
KET R&D focus	Innovation	Innovation			✓
Consumer preferences	Macroeconomic trends	Consumer demand			✓
Public support and acceptance	Macroeconomic trends/Public support	Consumer demand		✓	
Household income	Macroeconomic trends	Consumer demand			✓
Availability of funding	Finance	Capital			✓
Proximity to financial institutions	Finance	Capital			✓
Rate of SME formation	Industrial culture	Innovation		✓	
Presence of multinationals	Industrial culture	Capital/ Innovation			✓
Economic history	Industrial culture	Capital		✓	
Collaboration	Industrial culture/ Industry mix/ Institutions	Innovation		✓	✓
Entrepreneurial culture	Industrial culture	Innovation		✓	
Quality of workforce	Demographics	Labour			✓
Social criteria					
Prominent universities or research institute	Institutions	Innovation			✓
Regulation	Governance/ regulation	All		✓	
Intellectual property rights	Governance/ regulation	Innovation			✓
Governance	Governance/ regulation	All	✓		
Trade policy	Governance/ regulation	Consumer & business demand			✓
Size of population	Demographics	Labour/ consumer demand			✓

Use of eight different sectors in the bioeconomy

The bioeconomy is comprised of different sectors at different stages of the supply chain. Broadly spoken, there are sectors that supply biomass, sectors that convert biomass into intermediate products and sectors that bring biobased end-products to the market. BERST distinguishes 8 sectors in the bioeconomy (Table 4.2).

Table 4.2 Distinguished bioeconomy sectors in BERST

No.	Bioeconomy sector	Subsectors included (if more than one)
1	Primary biomass sectors	Arable, Livestock, Horticulture, Fishery, Aquaculture, Forestry/wood
2	Food & feed processing	Food processing, Feed processing
3	Construction	
4	Chemicals	Chemicals & polymers, Biorefinery
5	Pulp & paper	
6	Textiles & clothing	
7	Energy	Solid energy, Gaseous energy, Liquid energy, Co-digesting
8	Biotechnology	R&D services in biomass

Current state of the bioeconomy in a region and its potential

The set of criteria and indicators was validated for the eight sectors of the bioeconomy in a pilot of NUTS3 regions from the UK and the Netherlands. This was done by developing a framework that allowed for an assessment of the current state of the bioeconomy in a region and its potential. As the BERST project is not a model analysis study, but based on the use of observed statistical data, the bioeconomy potential is not an estimate in terms of concrete numbers for a region's future size of the bioeconomy (the amount of euros or the amount of tonnes in 2030). However, it provides an indication of a region's potential to developing its bioeconomy by focussing on issues like:

- What are the current strong and weak points of a region (measured by a set of criteria and indicators, based on observed data; compared with other regions) from this perspective?
- How to develop smart specialization strategies that could support the exploration of this bioeconomy potential?
- How does the roadmap towards being a bioregion look like?

BERST metabase tool (http://berst.databank.nl/)

In order to facilitate this quantitative analysis, available data that corresponds to the criteria have been identified and collected from a variety of sources and missing data have likely been provided by BERST regional partners themselves. These data were stored in the online BERST metabase tool (catalogue of criteria and indicators). This metabase serves as a tool that can:

- organise the data associated with criteria, over years and over regions, collected from various sources;
- facilitate the comparison of data associated with criteria across different regions;
- facilitate the comparison of data associated with criteria between regions and Good Practice regions;
- visualize the data associated with criteria by tables, figures, graphs, and maps.

Table 4.3 addresses the indicators that have been applied in BERST in order to describe the potential bioeconomy, the rationale behind their choice, and the quality of the indicators.

Table 4.3 Indicators used in the BERST project for describing the current and potential regional bioeconomy

Environmental criteria	Indicators	Unit/ metrics	Reason for indicator choice	Quality of indicator
Biomass availability	Domestic production of biomass (agriculture & horticulture, forestry, blue, waste)	Kg/capita	In most regions biomass is produced domestically, rather than imported	Fair, indicator gives very good insight into criteria, but data is estimated from national data using regional employment , rather than directly observed
	Presence of continuous supply of biomass with constant quality	qualitative *)	Addresses issue of sustainability and is ambiguous about source of supply	Good, indicator is a direct observation of regions' biomass supply, although qualitative rather than quantitative

Land use	Forestry land (as % of total land area)	%	Land use for primary biomass purposes most relevant to bioeconomy suitability	Good, indicator gives good quantitative insight into bioeconomy-relevant land use
	Agricultural & horticultural land (as % of total land area)	%		
Infrastructure	Attractiveness of region as place to settle for researchers and entrepreneurs	qualitative	Attractiveness of place is outcome of state of infrastructure; perhaps better than quantitative measure of networks	Good, very relevant indicator, although qualitative rather than quantitative

*) A qualitative indicator is valued by regional stakeholders as weak, moderate or strong

Economic criteria	Indicators	Unit/ metrics	Reason for indicator choice	Quality of indicator
Cluster size	Firms in total bioeconomy sector as % of total firms in region	%	Where the number of firms in relevant part of bioeconomy sectors is high it suggests a strong degree of potential clustering. This includes firms in the 'traditional' non-biobased sector as well as bioeconomy firms; the 'traditional' base is key to future development of the sector, particularly in the chemical and energy sectors, as they have the most potential to substitute fossil fuel inputs with bio-based equivalents.	Good, quantitative indicator which is strongly related to overall size/strength of cluster
	Firms in chemical sector as % of total firms in region	%		
	Firms in energy sector as % of total firms in region	%		
	Firms in paper & pulp sector as % of total firms in region	%		
	Firms in textile sector as % of total firms in region	%		
Employment structure	Employment in total bioeconomy sector as % of total employment in region	%	Detailed employment data shows current size of potential bioeconomy. This includes firms in the 'traditional' non-biobased sector as well as bioeconomy firms; the 'traditional' base is key to future development of the sector, particularly in the chemical and energy sectors, as they have the most potential to substitute fossil fuel inputs with bio-based equivalents.	Good, quantitative indicator which is perfect measure of employment structure
	Employment in chemical sector as % of total employment in region	%		
	Employment in energy sector as % of total employment in region	%		
	Employment in paper & pulp sector as % of total employment in region	%		
	Employment in textile sector as % of total employment in region	%		
Availability of	Availability and access of	qualitative	Gets to centre of issues around	Good, are key questions, but only
funding	bioeconomy cluster to public funds		role of government in providing funding	qualitative (no useful quantitative data on this criteria)
	Availability and access of bioeconomy cluster to private funds	qualitative	Is the key question around availability of funds	
Innovation	R&D expenditure	index	R&D expenditure has a direct impact on supply of innovation. The R&D expenditure index was taken from the Regional Innovation Scoreboard, produced by European Commission. The R&D expenditure in public and private sectors were calculated as a percentage of regional gross domestic product.	Good, R&D expenditure is strongly linked to innovation performance

	SME birth rate (number of starting firms in total firm number)	%	High levels of firm creation are indicative of strong innovation culture	Good, relevant indicator and quantitative measure
	Sector dynamics (% micro firms in bioeconomy subsector *x* as % of micro firms in all sectors in region)	index	Measures role of small firms relative to 'whole economy' tendency towards small firms – and small firms tend to be most innovative	Fair, less strongly linked to innovation performance than two indicators above but still relevant
	Number of competitive bioeconomy products brought to the market in last 3 years	number	Measures level of success in bringing innovative products to market in the sector	Good, direct measure of innovation outcomes rather than just supply-side
	Presence of an innovative milieu directed at the bioeconomy cluster	qualitative	Environment can help to foster innovation supply and demand	Good, very relevant to criteria, but only qualitative measure

Social criteria	Indicators	Unit/ metrics	Reason for indicator choice	Quality of indicator
Cluster management	Presence of a RIS3 with bioeconomy focus	qualitative	Demonstrates a public-sector focus on bioeconomy	Good, although does not reflect quality of public sector strategy/focus
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	qualitative	Incubators are likely to lead to more business start-ups and higher survival rates	Good, reflect quality of cluster management, although no indication of incubator quality
	Presence of an incubator	qualitative	Incubators are likely to lead to more business start-ups and higher survival rates	Fair, less clearly related to cluster management
	Biocluster is integrated or closely tied to a science/technology park	qualitative	Links to existing parks likely to make business expansion easier	Fair, less clearly related to cluster management
Demographics	Population growth (% per year)	%	Key indicator of demographic movements	Good, closely related to key demographic trends
	Population between 15-65 years (share of total population)	%	Key indicator of size of potential workforce	Fair, data does not distinguish based on skill level of population
	Income per capita	Euro/ capita	Higher income owner can lead to greater demand for bioeconomy outputs	Good, reflects ability of population (regardless of size) to pay for outputs of bioeconomy
Quality of workforce	Population with secondary & tertiary education	%	More skilled workforce more likely to be able to perform high value-added roles in bioeconomy	Good, very strong measure of workforce quality
	Access to know-how index (good *indicator is missing)*	qualitative	Reflects specific knowledge needs of the bioeconomy workers	Fair, the indicator shows how the quality of workforce reflects on the needs of businesses, but it is only qualitative data
Policy/ regulation setting	Commitment of regional policy makers and regional biocluster policy	qualitative	Indicates their willingness to adapt policy/regulation to make business easier for the bioeconomy	Good, the indicator demonstrates the policy/regulation setting, although it is only qualitative

By using the BERST metabase tool, the current industry mix through shares of total employment and total firms in a specific sector in a region have been compared to the national average by means of spider diagrams (Figures 4.3 and 4.4). The structure of the regional bioeconomy compared to the national average has been presented by readiness assessments (Figure 4.5).

Figure 4.3 Employment structure (%) in Madrid in 2013 compared to Spanish average

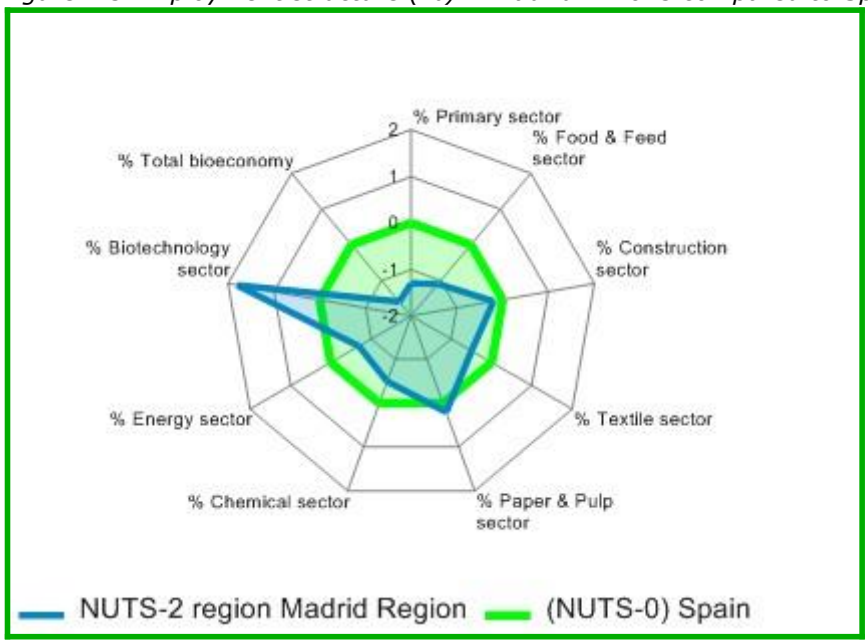


Figure 4.4 Firm structure (%) in Madrid in 2013 compared to Spanish average

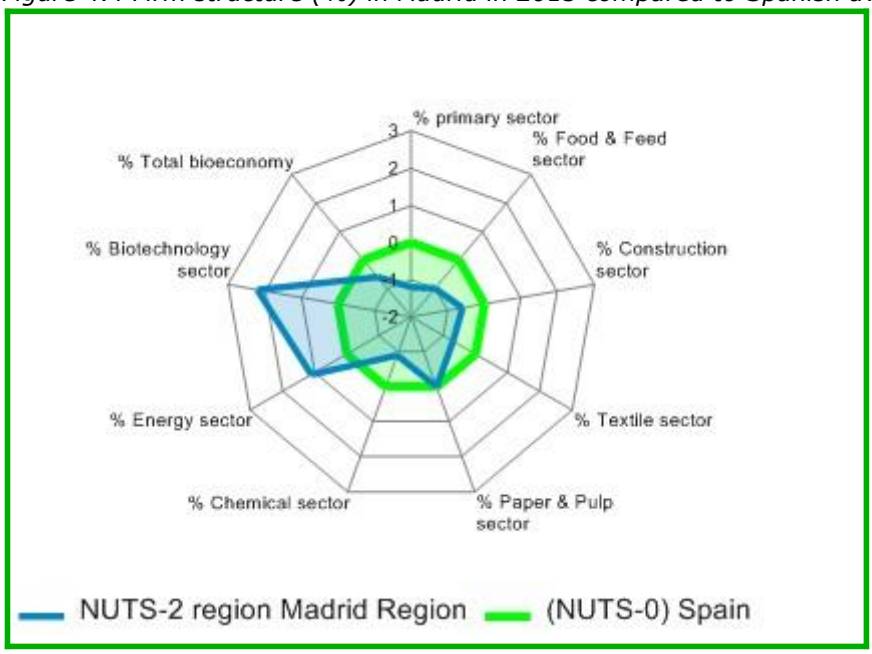
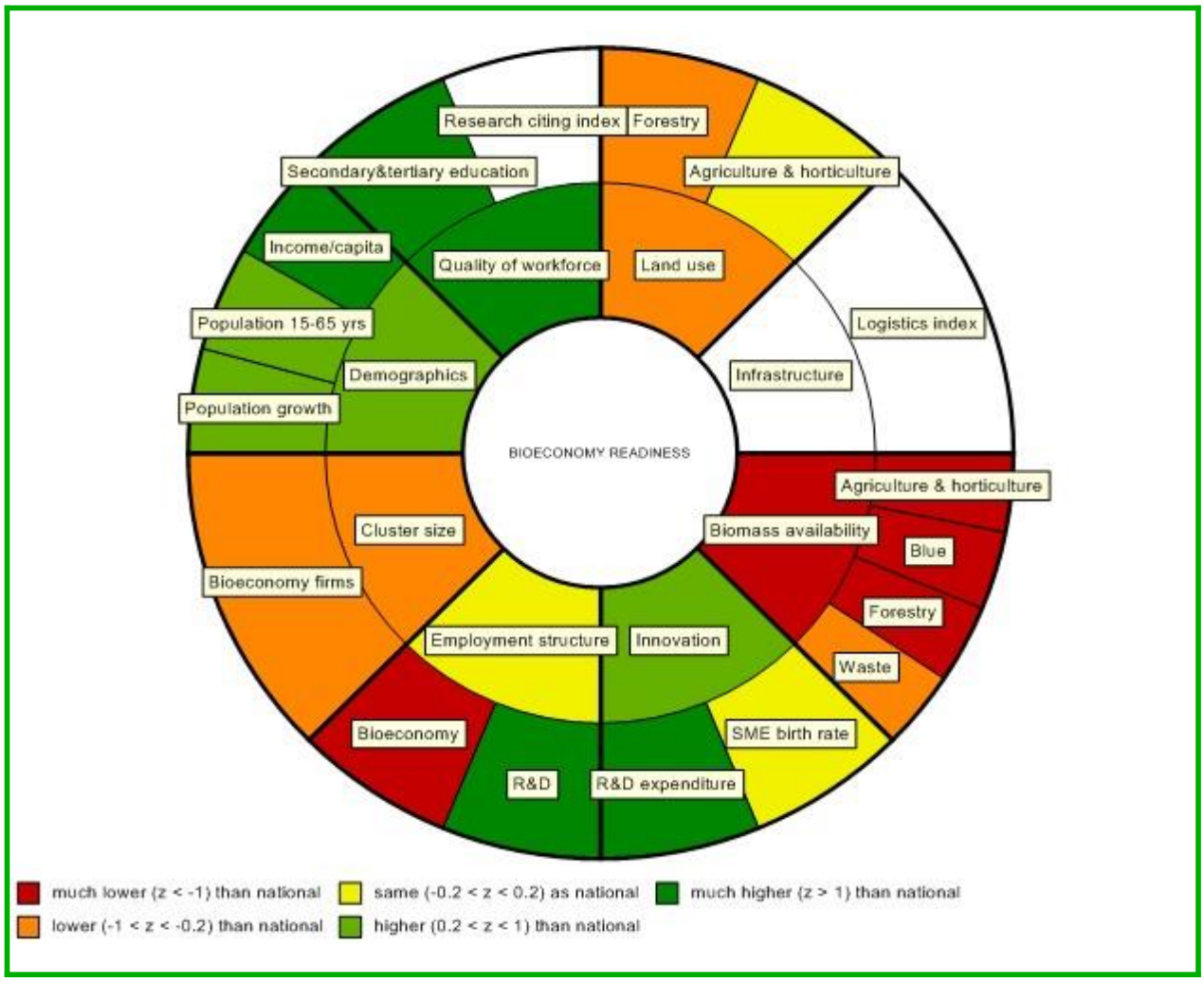


Figure 4.5 Bioeconomy Readiness for in Madrid in 2013 compared to Spanish average



4.1.3.3 Developing a catalogue with Instruments and Measures (WP2)

Catalogue of Instruments & Measures enabling regional bioeconomy development (https://berst.vito.be)
Work package 2 has developed an online Catalogue of Instruments & Measures (I&Ms), which allows stakeholders to search in a targeted way for instruments & measures enabling regional bioeconomy development. In this way, the catalogue may support stakeholders to develop their own strategies and business plans towards developing a regional bioeconomy and to learn from and get inspired by experiences in other regions. Targeted stakeholders of the catalogue include regional and national policy makers and entrepreneurs from profit and non-profit organisations. An I&M can be broadly interpreted as any policy, law, method, mechanism, tool or action, used by governments, the profit or non-profit sector or society as a whole to boost the development of the regional bioeconomy.

The online catalogue/tool is hosted at https://berst.vito.be/. The tool structure and data content was defined by VITO in close collaboration with the regional BERST partners and with focus on data usefulness and user-friendly data-mining. Populating the tool with I&Ms was performed by i) regional partners, ii) external stakeholders, iii) VITO and consortium partners. Prior to publishing I&Ms in the tool a quality check was performed by VITO.

Information collected per instrument/measure
An extensive list of information features has been collected For each I&M. These features were divided into three categories, namely key information, contact references and advanced information (Table 4.4).

Table 4.4 I&M information categories and features

Key Information	Contact References	Advanced Information
Short name (English)	Full name (English)	Feedstock type targeted *1*
Country/Region (up to NUTS3) *2*	Full name (native language)	Product type targeted *3*
Description *4*	Links *5*	Value Chain *6*
Goal/Aim *7*	Responsible authority	Enterprise Scale *8*
Type (and subtype)	Contact of responsible authority	Connection with National Policy *9*
Sector/Topic targeted *10*	Completed by *11*	Year started/ended
Status *12*		Budget *13*

1 Provides information if I&M is dedicated to a specific feedstock type (agriculture, forestry, waste, etc.).
2 Selects the geograpichal level (EU, country, region) for which the I&M is applicable. You can detail up to the appropriate NUTS level as required. (e.g., select 'Belgium', than select 'Flanders'). If an I&M is applicable to multiple regions e.g. for international or interregional cooperation this can be adopted as well (e.g. if applicable to the Netherlands and Germany, select 'Netherlands' than select 'Germany').
3 Provides information if I&M is dedicated to a specific (end)product (bioplastics, bioenergy, wood , etc.).
4 Provides a description of the I&M.
5 Provides hyperlinks to website information (e.g. legislation, general information, responsible ministries, etc.).
6 Provides information if the I&M targets specific segment(s) of the value chain (e.g. primary production, transport/logistic, conversion, etc.).
7 Describes primary goal (and secondary goal, if applicable) of the instrument or measure (e.g. increase bioenergy production, tax reduction on green jobs, position paper on sustainability, secure biomass supply, etc.).
8 Provides information if the I&M targets a specific enterprise scale (large, SME).
9 Provides information if a regional I&M is directly linked to (a result of) national policy.
10 Selects the specific sector and/or topic that is targeted by the I&M. Multiple selections are possible to indicate combinations (e.g. selecting 'forestry' and ' employment' indicates an I&M focuses on job creation in the forestry sector; selecting only 'employment' indicates the I&M addresses the bioeconomy overall).
11 Provides affiliation or email contact of the entity which submitted the information into the tool.
12 Indicates whether a I&M is in force, in revision, superseded or ended.
13 Provides additional information if a specific budget is foreseen for the I&M.

Four main types of instruments & measures

In the tool, four main types of I&M enabling regional bioeconomy development were distinguished (Table 4.5).

Table 4.5 Main types of instruments & measures enabling regional bioeconomy development

Type	Description
Economic/financial instruments	Instruments and measures that stimulate certain activities, behaviour or investments using financial support and price signals to influence the market. These include fiscal and financial policy instruments such as taxes, tax relief, grants or subsidies, feed-in tariffs, and loans for the purchase or installation of certain goods and services. They also include direct public funding and procurement rules, and market mechanisms such as tradable permits.
Research and development	Instruments and measures aimed at supporting technological advancement, direct or indirect, in technology research, development, demonstration and deployment activities.
Regulatory (binding) instruments	Covers a wide range of instruments and measures with which (mainly) a government imposes targets, obligations and standards on actors requiring them to undertake specific measures and/or report on specific information.
Voluntary (non-binding) initiatives	Refers to instruments, measures and 'actions' in a broader sense that are undertaken voluntarily either by public agencies, the private sector, NGO's, citizens, etc. Examples are strategies, roadmaps, action plans, guidelines, cluster and platform organisations, setting of indicative/non-binding targets, voluntary agreements, position papers, viewpoints, collaboration structures, etc.

Sectors and topics addressed in the tool

The tool also indicates at which sector(s) and/or topic(s) the I&M is targeted. Sectors refer to agriculture, forestry, energy, etc. and topics to climate, employment, firms, etc. In total 26 sectors and topics are defined (Table 4.6). Sectors and topics can be combined in one information feature to allow for combinations to be made: e.g. indication of 'forestry' and ' employment' (multiple select) for an I&M indicates that the I&M is targeted on employment (job creation) in the forestry sector. Selecting only 'employment' (single select) indicates the I&M addresses job creation in the bioeconomy overall.

Table 4.6 Sectors and topics in the online catalogue of I&M

Sector/Topic	Employment	Legal
Agriculture	Energy	Mobility, transport and logistics
Biotechnology	Environment (soil, water, air, nature, biodiversity, etc.)	Products
Climate	Sector/Topic	Public sector
Clustering, co-operation and networking	Finance	Research and Innovation
Communication and information	Fisheries	Support and advisory
Consumer and societal affairs	Forestry	Taxation and Trade
Development (regional, rural, urban, etc.)	Health and public safety	Waste
Economy	Industry, enterprise and commerce	
Education, training and human resource development	Infrastructure	

Instruments and measures are directed at a wide variety of objectives

I&Ms cover a wide variety of objectives. This is particularly true for I&Ms acting at regional level. Regions deploy I&Ms with both very general as well as very specific objectives. To allow for a meaningful analysis of all I&Ms, regarding their goals/aims, 11 objectives were defined based on literature review, input from BERST Community of Practice partners, BERST regional partners and BERST scientific partners (Table 4.7). Objectives allow to cluster the specific aims of the individual regional I&Ms in a structured way.

Table 4.7 Objectives of instruments & measures enabling regional bioeconomy development

1. Address the cooperation needed to start biobased businesses	7. Enable a reliable and constant availability of biomass feedstock
2 Ensuring the availability of financial resources	8. Enhancing the creation of jobs and ensuring availability of required skills
3 Building a strong research, development and innovation base	9. Fostering effective governance and involvement of the society
4 Building competitive biobased industries	10 Fostering the development of strong biobased markets
5. Creating a reliable and enabling policy setting	11. Learning from the strategies/actions of other regions or clusters
6. Creating an attractive environment including infrastructure	

Use of the catalogue of instruments and measures
The tool can be used in two interfaces; with and without account/log-in.

Without account/log-in the tool provides the following functionalities:

- a general search by a comprehensive set of information fields:
  - e.g. region, type of measure, sector or topic, feed stock type, etcetera;
- a search by objectives of measures relevant for the deployment of a regional bioeconomy:
  - e.g. enabling financial resources, ensuring biomass availability, etcetera;
  - note: one can search in a targeted way filtering out only these I&Ms that score e.g. (very) high on one specific objective, for example, if the user is interested only in I&Ms from other regions that 'enable financial resources';
- a search by criteria:
  - note: The I&Ms in the tool are linked, to the extent possible, to criteria on which they have an (in)direct impact. Criteria provide an outlook of the current and potential future status of a region's bioeconomy (see section 4.1.2);
  - e.g. if you select the criterion 'Availability of funding' you will receive a list of all I&Ms being deployed by regions that have an (in)direct effect on the criterion 'Availability of funding';
- a search by case study regions/Good Practice regions providing a dashboard overview of exemplary regions:
  - e.g. Bio Base Westland, Ghent Bioeconomy Valley, Central Finland, etcetera.

With account/log-in the tool provides some additional functionalities:

- add I&Ms: the concept of the tool is one of an open community, where one can freely submit additional I&Ms. A user-friendly interface was developed that becomes available after log-in. This functionality is part of an overall strategy to complete the tool as much as possible interacting with the target group and stakeholders. Prior to final publication in the tool, the I&Ms first undergo a quality check;
- manage I&Ms before submission.

Each account-holder has a section foreseen where I&Ms can be stored in a draft version before submission. This allows the users to work on new I&Ms in a phased manner, for example, to gather more data, contact other relevant experts or have the information checked by a third party. An account/log-in is required to prevent the tool from being spammed by automated malware or non-relevant human interaction.

Comparative analysis of used instruments and measures enabling regional bioeconomy development
The tool currently contains 790 unique instruments and measures of which the majority (55%) originates from the national level. About 30% refer to the EU level and one sixth to the regional level. The majority of the instruments and measures can be classified as economic and financial instruments or regulatory instruments (Figure 4.6). It appears that the instruments and measures are widely scattered among objectives (Figure 4.7). Creating a reliable and enabling policy framework (14%) and building competitive biobased industries (12%) are mostly represented. However, most of the other objectives are just slightly behind and score between 8-10%. Only the objectives related to biomass availability (5%) and learning from other regions (5%) are noticeably less represented. I&Ms can be related to several sectors and topics. I&Ms in the tool are on average related to 2-3 sectors and/or topics, varying in a range of 1 to 5. Energy is the most prominent sector/topic addressed by 313 (16%) selected I&Ms, followed by environment (200 I&M; 10%), agriculture (148 I&M; 7%) and research & innovation and industry & enterprises & commerce (each 144 I&M; 7%) (Figure 4.8).

Figure 4.6 I&M distribution by type (total count between brackets)

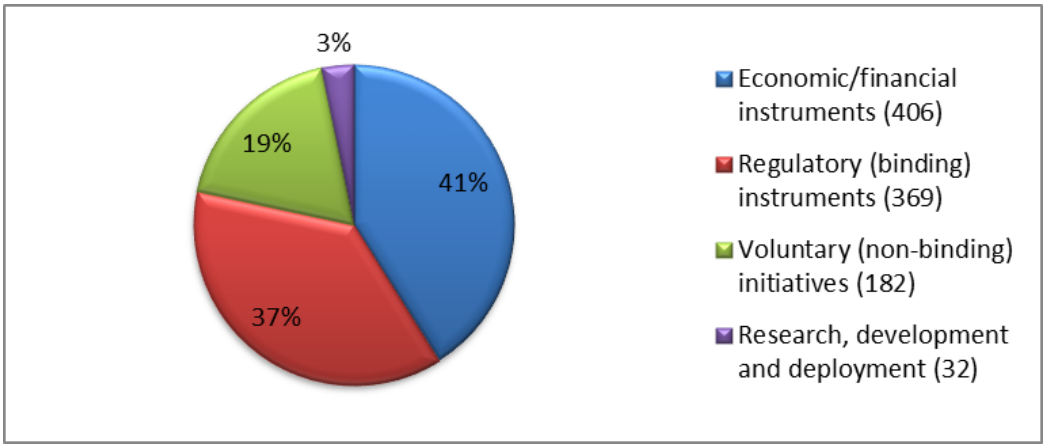


Figure 4.7 I&M distribution by objective (1st x-axis: percentage; 2nd x-axis: total count)

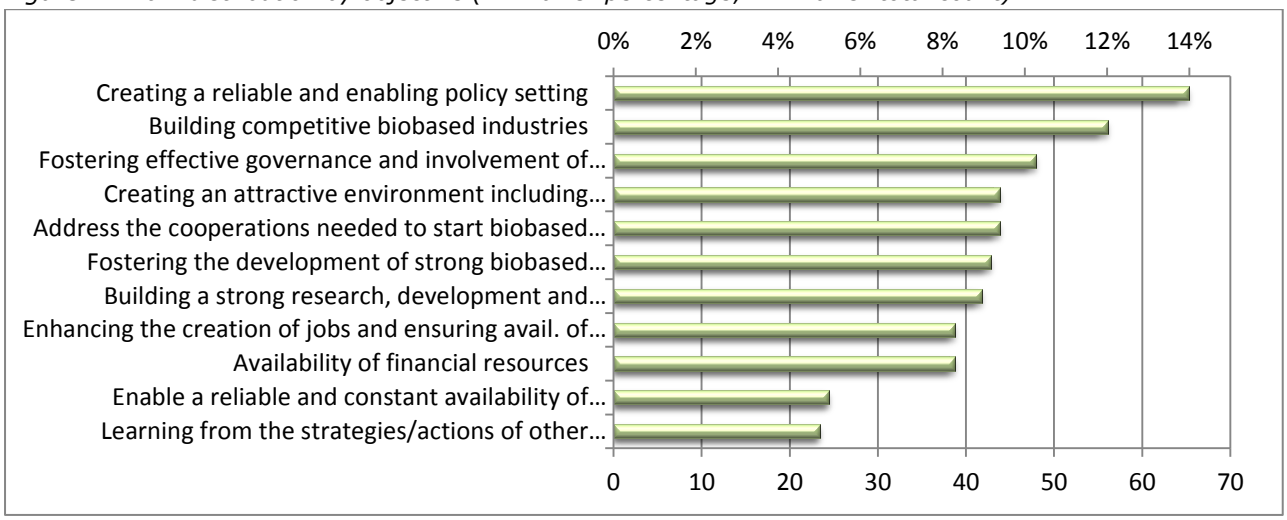
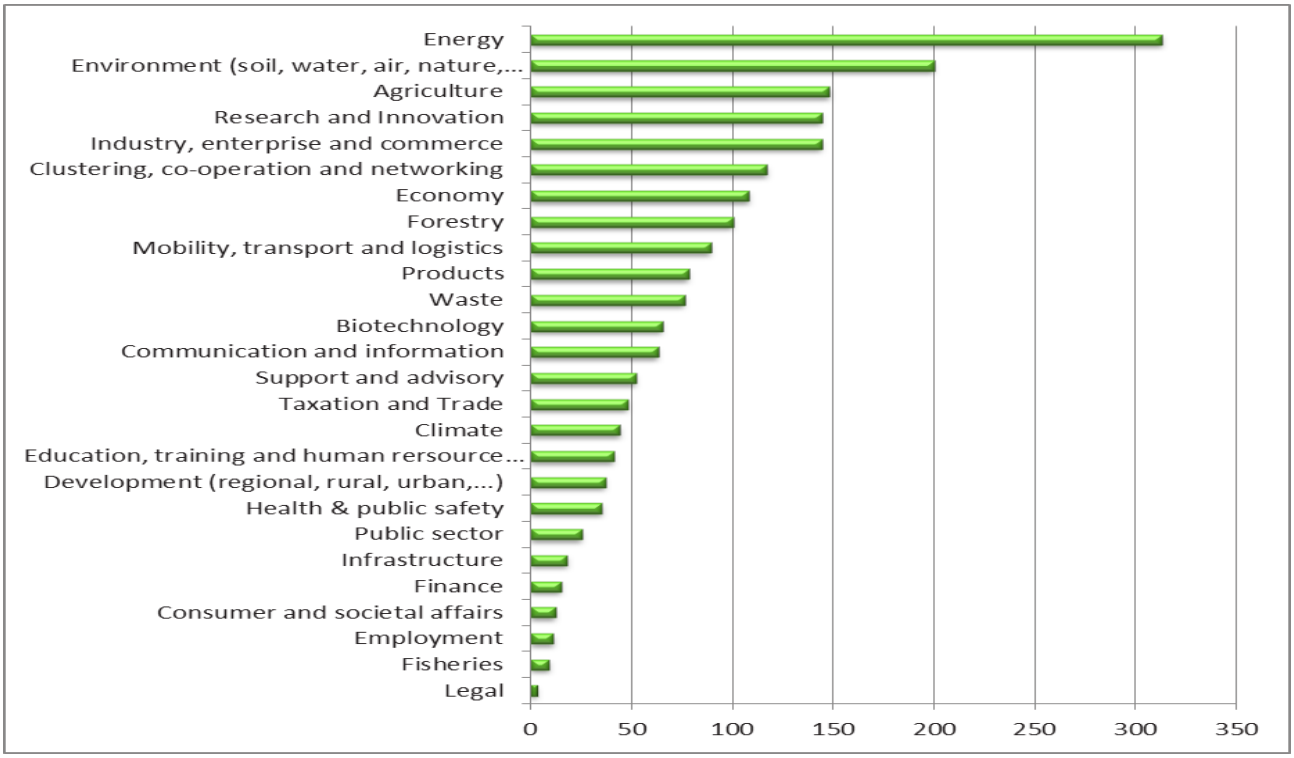


Figure 4.8 I&M distribution by sector/topic (total count)



4.1.3.4 Developing a catalogue with Case study and Good Practice regions (WP3)

Work package 3 has explored the development path of a selected number of regional bioeconomy clusters in the EU. On the one hand, the focus was at so-called Good Practices, i.e. regions with a mature biocluster; on the other hand, we studied less mature bioclusters in the BERST regions, i.e. regions of the partners of the BERST project (Table 4.8).

Table 4.8 Overview of studied bioeconomy clusters in the BERST project

Good Practices in BERST	BERST regions
Ghent (Belgium)	Central Finland (Finland)
North Rhine Westfalia (Germany)	Straubing (Germany)
Toulouse (France)	Biobase Westland (Netherlands)
Manchester (UK)	Biobased Delta (Netherlands)
	Madrid region (Spain)
	Western Macedonia (Greece)
	Slovenia

Clusters: input-output linkages and untraded interdependencies

A cluster can be denoted as a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities (Oxford Research AS, 2008)[3]. The associated institutions might consist of R&D institutes, universities, policy makers and finance institutes. In the cluster, firms are supposed to be tied to other firms through formal exchanges (i.e. the input-output linkages) and through untraded interdependencies (Storper, 1995)[4]. These include labour markets, public institutions, and rules for action, customs, understandings and values. The untraded interdependencies can also be seen in terms of 'regional production culture' or 'civic culture', i.e. the set of virtuous connections of economic coordination, which mobilize capacities for efficient economic action. The untraded interdependencies form the public assets of the production system and they may differ among regions. In their review of industrial clusters, Armstrong and Taylor (2000)[5] denote the untraded interdependencies in terms of social capital and institutional thickness. Social capital refers to features of social organization such as norms, trust and networks, that improve the efficiency of society by facilitating coordinated action (Putnam, 1993)[6]. According to social capital theory economic development in part depends on the cultural characteristics of the local community. Institutional thickness refers to a strong local network of private and public institutions. The cluster evolves by a collective learning process in which actors continuously develop new technical knowledge, adopt innovations, and adapt to changing local and global circumstances (Armstrong and Taylor, 2000)[7].

In an analysis of 16 bioeconomy clusters in Europe, the US, Canada and Japan, PcW (2011)[8] found that apart from the above mentioned input-output linkages among firms, social capital and institutional thickness, some additional attributes may play a supportive role in the development of a bioeconomy

[3] Oxford Research AS (2008), Cluster policy in Europe; A brief summary of cluster policies in 31 European countries; Kristiansand, Europe Innova Cluster Mapping Project; Via website: http://www.clusterobservatory.eu/system/modules/com.gridnine.opencms.modules.eco/ providers/getpdf.jsp?uid=100146.

4 Storper, M. (1995), The resurgence of regional economies, ten years later: the region as a nexus of untraded interdependencies; European Urban and Rural Studies 2-3, 1995, p. 191-221.

5 Armstrong, H. and J. Taylor (2000), Regional economics and policy; Oxford, Blackwell Publishers, third edition.

6 Putnam, R. (1993),Making democracy work; Princeton, Princeton University Press.

7 See above.

8 PcW (2011), Regional Biotechnology Establishing a methodology and performance indicators for assessing bioclusters and bioregions relevant to the KBBE area; Brussels; Via website: http://ec.europa.eu/research/bioeconomy/pdf/regional-biotech-report.pdf.

cluster: first, a cluster organization with a capable team that coordinates the activities of the bioeconomy cluster and second, an incubator for supporting technology transfer efficiency, new business creation and growth by offering dedicated infrastructure and human resources to help companies take off.

Bioeconomy clusters in BERST

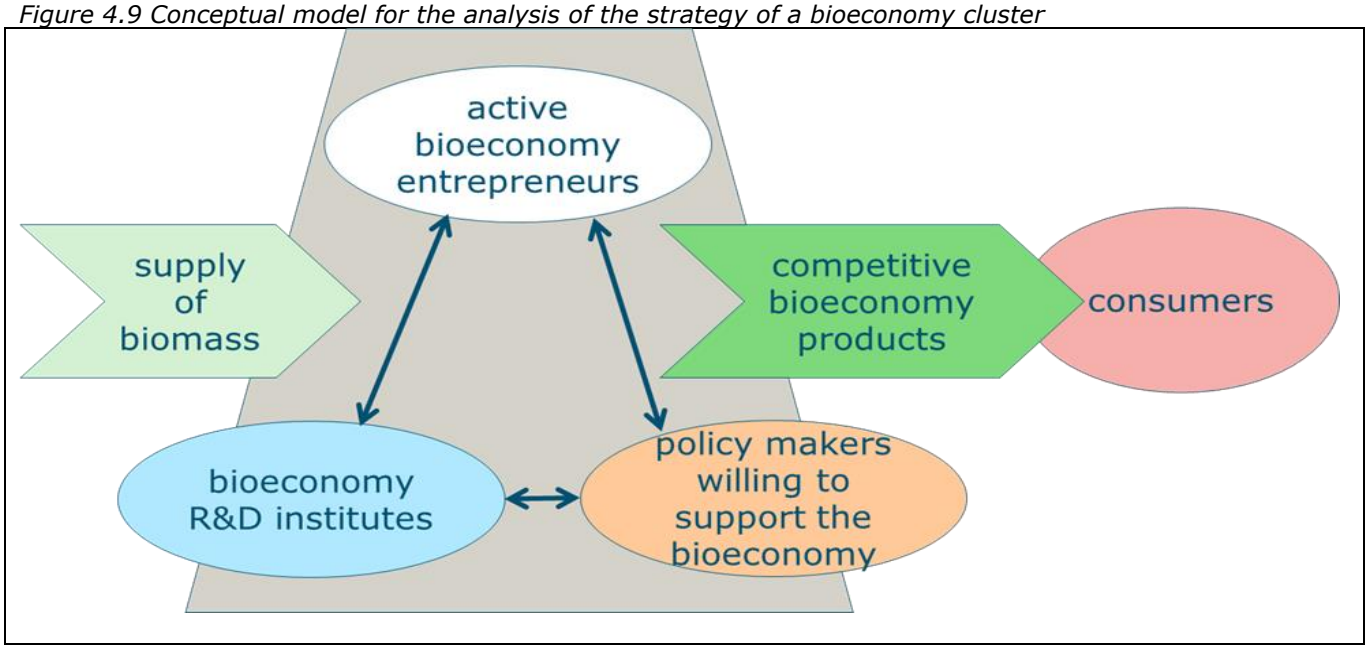
In BERST, a bioeconomy cluster is perceived as a geographically proximate group of interconnected companies and associated institutions aiming to develop the bioeconomy. In this cluster, firms are tied to other firms through formal linkages (i.e. the input-output linkages) and through untraded interdependencies (norms, trust and a strong local network of private and public institutions). Given the broad coverage of sectors within the bioeconomy, bioeconomy clusters might be rather heterogeneous in their specific focus. The development and marketing of bioeconomy products does not differ from other products: the challenge is to introduce competitive bioeconomy products that can be sold in profitable quantities on the basis of its price, quality, and service combination preferred by buyers over that offered by competing products. This implies that in the analysis of the development of the bioeconomy clusters the same three factors play a role as in the case of clusters aiming at the introduction and marketing of televisions or cars: input-output linkages among firms, social capital and institutional thickness.

Two starting points in the analysis: key assets and a long run time horizon

The input-output linkages among firms, social capital and institutional thickness in the cluster are all embodied by actors with varying properties. In the analysis of the development path of a bioeconomy cluster, we assume that the actors of the region, in which the cluster is located, apply a strategy to develop the bioeconomy by transforming biomass into competitive bioeconomy products. Such a transformation process takes time. Hence, our analysis is guided by two starting points:

1. a focus on five key assets of a bioeconomy cluster, as outlined in our conceptual model for the analysis of the strategy of a bioeconomy cluster (Figure 4.9). These are:
    a. *entrepreneurs*: the presence of an entrepreneurial culture with active, innovative, flexible and risk taking entrepreneurs plays a pivotal role in driving clusters towards successful development;
    b. *policymakers*: political leaders who are willing to support the development of the bioeconomy by providing governance, institutional structures and financial support;
    c. *knowledge institutes*: organizations that provide the technical knowhow and innovation for the development of bioeconomy products;
    d. *availability of biomass resources*: a continuous supply of biomass resources of constant quality is critical for the development of bioeconomy products;
    e. *competitive bioeconomy products*: commercially viable products, such as chemicals, medicines, food, bioplastics, transport fuels, electricity and heat.

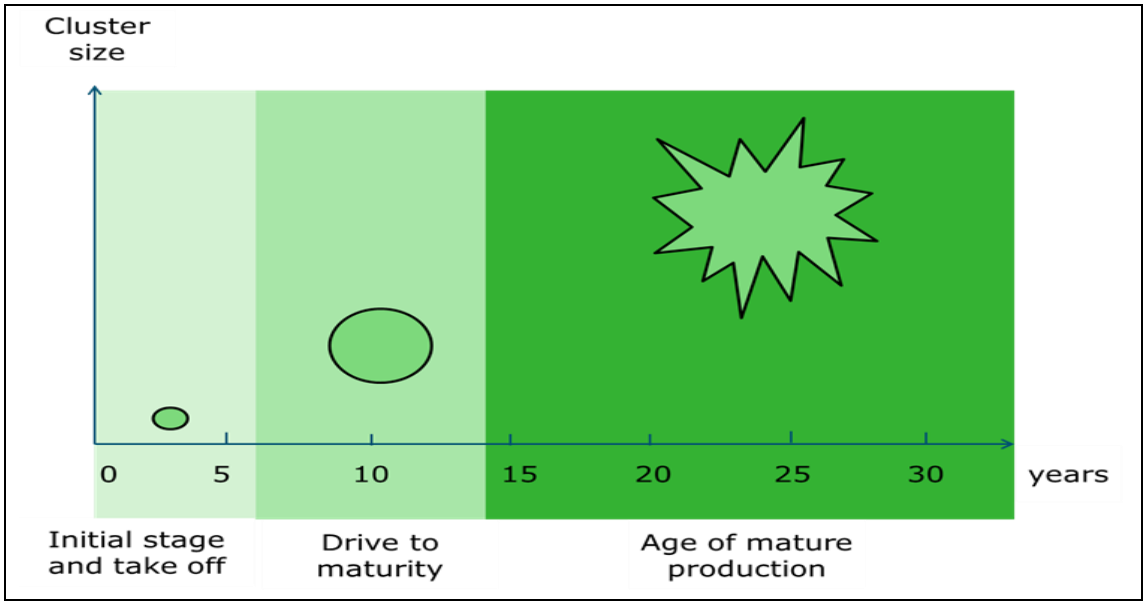
Figure 4.9 Conceptual model for the analysis of the strategy of a bioeconomy cluster



2. a long run time horizon of a bioeconomy cluster, in which we distinguish the next three phases:
    a. *initial stage and take off*: in this phase, the bioeconomy is introduced in the regional planning agenda and the policy, socio-economic and R&D landscape for its establishment and operation is created;
    b. *drive to maturity*: in this phase, the first competitive bioeconomy products are sold at the market. The cluster grows with the setup of new companies, cluster infrastructure (with incubator, training centre etc.) has been established, and the cluster is able to attract both private and public funding;
    c. *age of mature production*: in this phase, the cluster is able to produce competitive bioeconomy products at an extensive scale.

The exact duration of each of these phases differs from cluster to cluster. According to estimates of PwC (2011)[9] the duration of the initial stage and take off is about 5 years, that of the drive to maturity 5-10 years, and that of the age of mature production 10-20 years (Figure 4.10).

Figure 4.10 The development path of a bioeconomy cluster



Protocol for the analysis of bioeconomy clusters in Good Practice end BERST regions

By using a protocol with questions on the interaction of entrepreneurs, policy makers and knowledge institutes in each development stage of the bioeconomy cluster, narratives on the development path of the bioeconomy clusters in the Good Practices and BERST regions have been constructed and enabling factors and barriers have been identified. Both statistical data, literature and interviews with key actors have been used to collect information on the functioning of each bioeconomy cluster. In BERST, we first analysed the bioeconomy clusters of the Good Practices. This provided a number of key findings on the interaction of actors in the cluster. Subsequently, in the analysis of the BERST regions it has been explored to which extent the key findings of the Good Practices also apply for these bioeconomy clusters and which barriers they face in developing the bioeconomy cluster. Background reports with the complete analysis of the bioeconomy clusters in the Good Practices and BERST regions (Deliverable 3.1 and 3.2) are available on the BERST website (http://www.berst.eu/Publications.aspx).

9 PcW (2011), Regional Biotechnology Establishing a methodology and performance indicators for assessing bioclusters and bioregions relevant to the KBBE area; Brussels; Via website: http://ec.europa.eu/research/bioeconomy/pdf/regional-biotech-report.pdf .

Key findings from the Good Practices

From the analysis of the development path of the bioeconomy clusters in the Good Practices, a number of key findings emerge:

1. *Active actors organize the cluster as a bottom-up process and keep it moving by intensive networking*

The Good Practices show that a bioeconomy cluster usually starts as a partnership of R&D institutes and firms. Sometimes, as was the case in the Ghent Bioeconomy Valley, policymakers are involved as well. In each of the Good Practices there were a number of leading actors who had the capacity (knowlegde, skills and attitude) to mobilize other actors and to organize the cluster as a bottom-up process. By doing so, they managed to mobilize a group of active, innovative, flexible and risk taking entrepreneurs and a number of policy makers that provided governance, institutional structures and financial support. Along the development path of the bioeconomy cluster, there was a process of intensive networking with local and external actors, which stimulated the cluster actors to view the situation and prospects of the cluster in a broader national and international context, and which enabled an efficient transfer of knowledge, products and services within the cluster and between the cluster and the outside world.

2. *Cluster board that takes care of the organization of the cluster and communication*

The cluster can benefit from the establishment of a cluster board directly after its start, that is responsible for the organization of the cluster and an effective communication with actors inside and outside the cluster. If policymakers are not involved in the cluster, the creation of good working relations between them and the cluster and political commitment should be taken into account. As the needs of the actors in the cluster change over time due to changing local and global circumstances, the cluster board should adapt to these changes.

3. *Cluster makes use of the strong points of the region*

In the Good Practices the cluster is built upon the strong points of the region, like a well-known university, presence of R&D institutes, strong industrial networks, a strong economic sector, active actors, a well-developed transport infrastructure, etc.

4. *Cluster starts with activities in one economic sector*

The Good Practices started their activities in one economic sector. Due to crossovers to other sectors over time, a mature cluster covers several economic sectors.

5. *First, the cluster is mainly supported by public funds; later private funds become also available*

Usually, in the initial stage of the cluster there are only public RTD funds available. The lack of private funds in this stage could be explained by the fact that at this stage no marketable products are developed. However, there are exceptions as the case of Ghent Bioeconomy Valley shows: here private funds from the energy industry are already available in the initial stage of the cluster. In raising public funds in the drive to maturity stage and the mature production stage, it appears that the Good Practices do manage to raise public funds that are related to hot items on the regional, national or EU political agenda, such as targets for renewable energy, encouraging the bioeconomy, chemical policies, regional innovation policies, etc. Although funding is often project based, the Good Practices were able to ensure continuous funding.

6. *Biomass resources may originate from both local and external supply*

The supply of biomass resources as such is not considered as a barrier in the Good Practices, as a well-developed infrastructure enables the transport from both local and external supply. However, it remains a challenge to ensure a continuous supply of biomass resources of a consistent quality, as these resources often originate from seasonal feed stocks. Moreover, as biomass resources already have several end uses, an additional demand for new bioeconomy applications creates raw material competition. This may result in higher prices.

Barriers in developing bioeconomy clusters in the BERST regions

The BERST regions show a wide variety of cluster experiences, varying from the bioeconomy cluster in Central Finland, which could be considered as a Good Practice, to the collapse of the bioeconomy cluster PoliMat in Slovenia. Apart from the bioeconomy clusters in Central Finland and Biobased Delta, the

bioeconomy clusters in the BERST regions mainly suffer from weaknesses in the capacity of its actors. These weaknesses could be expressed as follows:

- lack of active participation of entrepreneurs in the cluster as they doubt the value of the cluster for their business;
- lack of an innovation culture among entrepreneurs, which is partly related to the small scale of many firms and lack of well-trained human resources;
- lack of cooperation and trust among firms and R&D institutes, which hampers on the one hand a focus of R&D institutes on the development of demand driven technologies, and on the other hand the adoption of innovations by entrepreneurs.

In a number of BERST regions, the bioeconomy cluster is imposed as a politically-led top-down initiative in an environment of entrepreneurs and R&D institutes which are not convinced of its usefulness and who show a low sense of ownership of the cluster. As long as public funds are available for projects, both R&D institutes and firms are ready to absorb them. However, when the projects have been completed and when no new public funds become available for the adoption of the results of projects, follow-ups hardly emerge. As a result, the cluster risks stagnation and even disintegration.

Although biomass resources were available in the BERST regions from local or external supply, several BERST regions experienced difficulties in transforming these resources into new bioeconomy products. These difficulties are due to varying quality, fluctuations in the supply, the collection of the supply from a large number of suppliers, and competition with other users of biomass resources.

4.1.3.5 Developing regional profiles (WP4)

4.1.3.5.1 Introduction

Online tool for creating regional bioeconomy profile fact sheets
Work package 4 has further designed the online tool (http://berst.databank.nl/) that can dynamically create a bioeconomy profile fact sheet for a selected region, as long as data have been collected for that specific region during the BERST project. Regional profiles are based on information collected and results achieved in all BERST work packages. A regional profile provides an overview of the current state of the bioeconomy in a region, suggests lessons for developing a bioeconomy cluster, and gives recommendations for instruments and measures. These ingredients can be helpful in drafting a smart development strategy for establishing or strengthening a bioeconomy cluster in the region. A roadmap, that is also included in the regional profile, can be used as starting point in the discussion on (further) developing a strategy for a bioeconomy cluster in a regional Community of Practice of entrepreneurs, R&D institutes and policy makers. Drafts of the regional profiles have been discussed with stakeholders in the BERST regions for feedback and an assessment on their usefulness for drafting bioeconomy strategies. Afterwards, the regional profiles were fine-tuned.

Structure of the regional profile fact sheet
Each regional profile consists of the following sections:

1. Introduction
    - What is a bioeconomy?
    - What is a bioeconomy cluster?
    - How to develop the bioeconomy cluster in region x?
    - Aim of this regional profile report.
2. The bioeconomy cluster in region x
    - Brief description of the bioeconomy cluster in region x.
    - Barriers for the development of the bioeconomy clusters in region x.
3. Quantitative and qualitative indicators of the bioeconomy cluster in region x
    - Regional structure.
    - Employment and firm structure of bioeconomy sectors.
    - Assessment of the qualitative indicators.
4. Further development of the bioeconomy cluster in region x
    - Lessons for the development of a bioeconomy cluster from Good Practice regions.

- Supportive instruments and measures to develop the bioeconomy cluster.
- Recommendations for the further development of the bioeconomy cluster in region.

5. Roadmap for developing a strategy for a bioeconomy cluster

In the following sections, we present the key issues of the regional profiles of the seven BERST regions.

4.1.3.5.2 Keski-Suomi: key issues of the regional profile

Brief description of the bioeconomy cluster in Keski-Suomi

The bioeconomy cluster in Keski-Suomi started in 1992 as a cooperation of R&D institutes, the Regional Council of Central Finland and entrepreneurs. The cluster aims at valorizing the forest biomass resources especially in the bioenergy. Recently the focus has changed towards industrial symbiosis particularly in pulp and paper industry. These are rather strong sectors in the region. Keski-Suomi also hosts extensive bioenergy R&D institutes and has a well-developed entrepreneurial culture, a well-educated manpower and a good transport infrastructure. The cluster benefited from strong and consistent support from the regional government and continuous technical guidance from regional R&D institutes. The cluster board, comprising R&D institutes, entrepreneurs and policymakers, provided focus and steered developments in the cluster. This resulted in good interactions and successful collaboration among the cluster actors. Entrepreneurs showed a high willingness to develop the bioeconomy and to pool resources towards new product development, amongst others by converting industrial waste from the primary processing of biomass resources into marketable products. By doing so, crossovers took place. The cluster is financed by public funding linked to national policy to create and maintain jobs in rural areas and to national and EU R&D and bioeconomy policies. Private funding became available from the drive to maturity stage.

Barriers for the development of the bioeconomy clusters in Keski-Suomi

The bioeconomy cluster in Keski-Suomi faces a number of barriers. These include:

- a low rate of start-ups in forest fuel production due to the small scale firm structure;
- the fragmented nature of the bioeconomy sectors hampers cross-overs;
- the perspective of the biocluster is rather national, e.g. international cooperation of SMEs is at a moderate level;
- road infrastructure shows some inadequacies, which hampers the transport of biomass resources;
- at present, absence of definite cluster organization which coordinates, manages and facilitates the bioeconomy cluster in Keski-Suomi.

Regional structure

Table 4.9 Indicators describing the potential bioeconomy in Keski-Suomi in 2013 compared to (NUTS-0) Finland average

Criteria	Indicator	Keski-Suomi	(NUTS-0) Finland	Keski-Suomi (z-
Land use	Forestry land [% of total land area]	11,5	9,4	0,3
	Agricultural & horticultural land [% of total land area]	4,7	6,7	-0,3
Biomass availability	Agricultural biomass production [kg/capita]	1,06	1,12	-0,1
	Blue biomass production [kg/capita]	0,04	0,03	0,3
	Forestry biomass production [kg/capita]	18,05	10,43	0,9
	Waste production [kg/capita]	0,69	0,58	0,3
Innovation	SME birth rate [% of total firms in region]	9,8	9,9	0,0
	R&D expenditure [index (EU=1)]	0,63	0,63	0,0
Employment structure	R&D employment [% of total employment in region]	1,5	1,6	-0,2
	Employment in total bioeconomy sectors [% of total employment in region]	12,7	12,3	0,2
	Employment in chemical sector [% of total employment in region]	0,2	0,6	-0,8
	Employment in energy sector [% of total employment in region]	0,4	0,5	-0,6

	Employment in paper & pulp sector [% of total employment in region]	1,5	0,7	0,8
	Employment in textile sector [% of total employment in region]	0,2	0,3	-0,6
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	36,5	31,2	0,5
	Firms in chemicals sector [% of total firms in region]	0,2	0,2	-0,2
	Firms in energy sector [% of total firms in region]	0,4	0,4	0,4
	Firms in paper & pulp sector [% of total firms in region]	0,0	0,1	-0,4
	Firms in textile sector [% of total firms in region]	0,5	0,5	-0,3
Demographics	Population growth [% year in region]	0,3	0,4	-0,2
	Population 15-65 years [% of total population in region]	64,1	64,8	-0,3
	GDP (PPP) [index (EU=1)]	105,00	116,00	-0,5
Quality of workforce	Secondary & Tertiary education [% of total population in region]	85,8	85,8	0,0

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average (corrected for standard deviation).

Figure 4.11 Bioeconomy Readiness for Keski-Suomi in 2013 compared to (NUTS-0) Finland

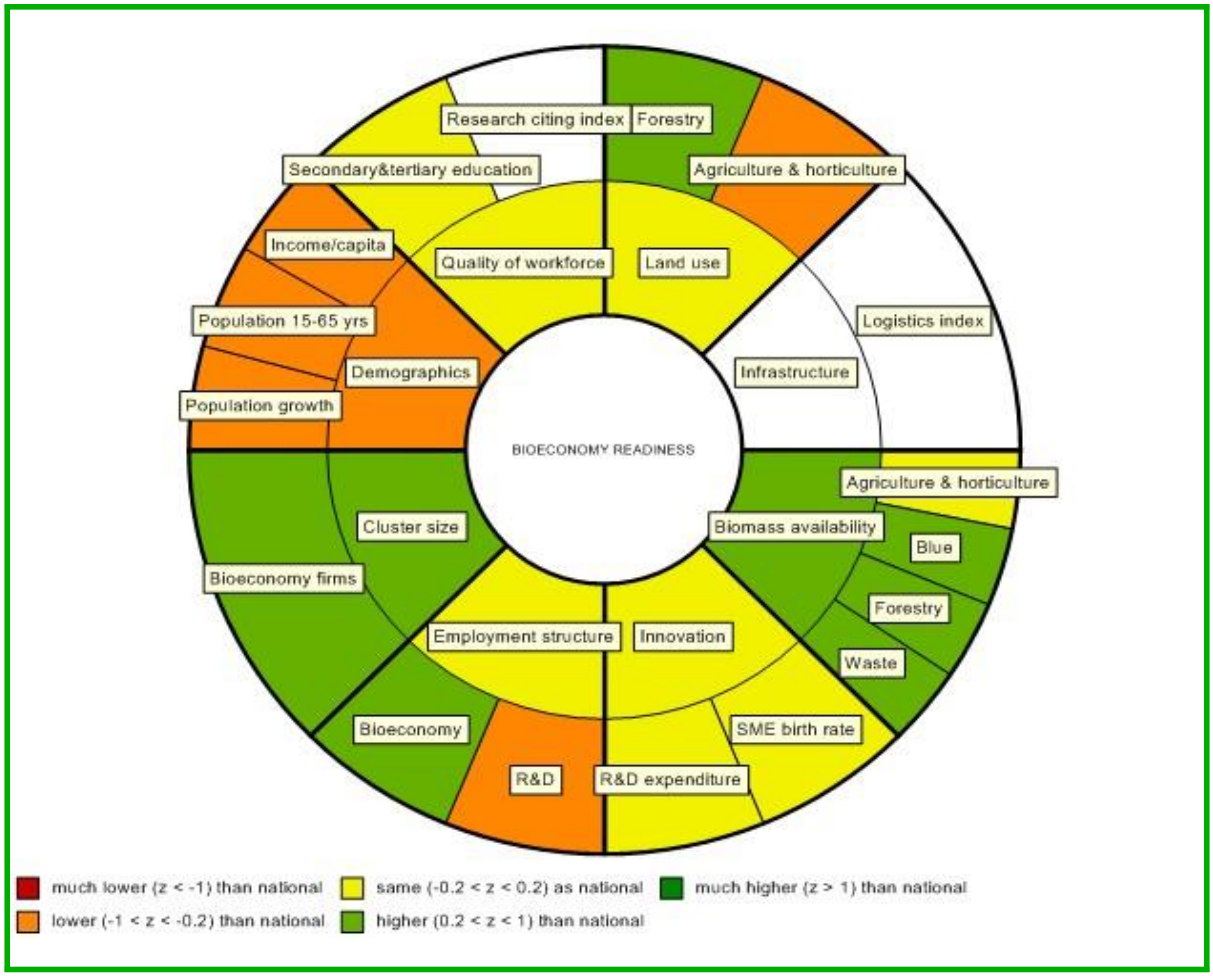


Figure 4.12 Employment structure (%) in Keski-Suomi in 2013 compared to (NUTS-0) Finland

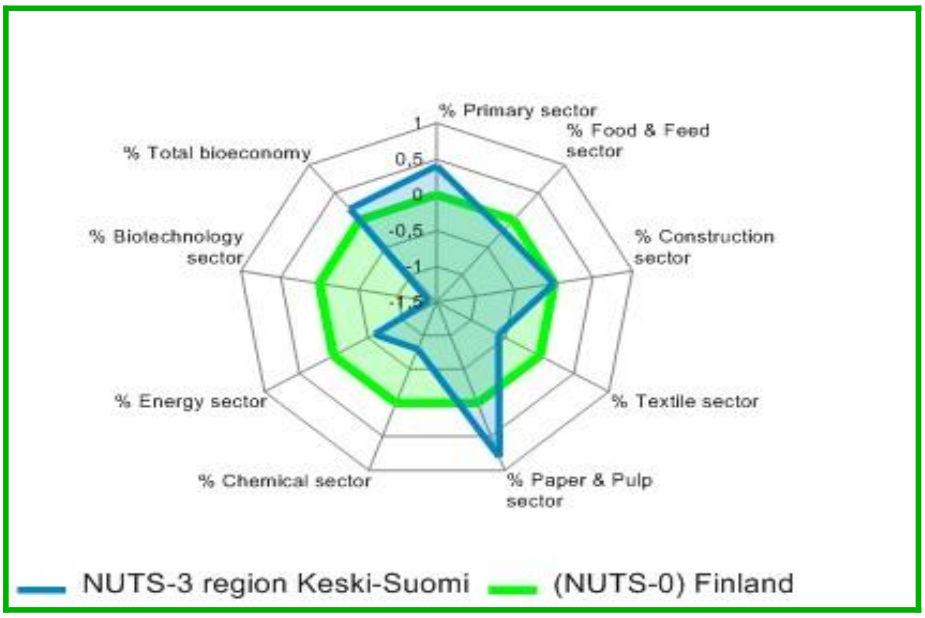
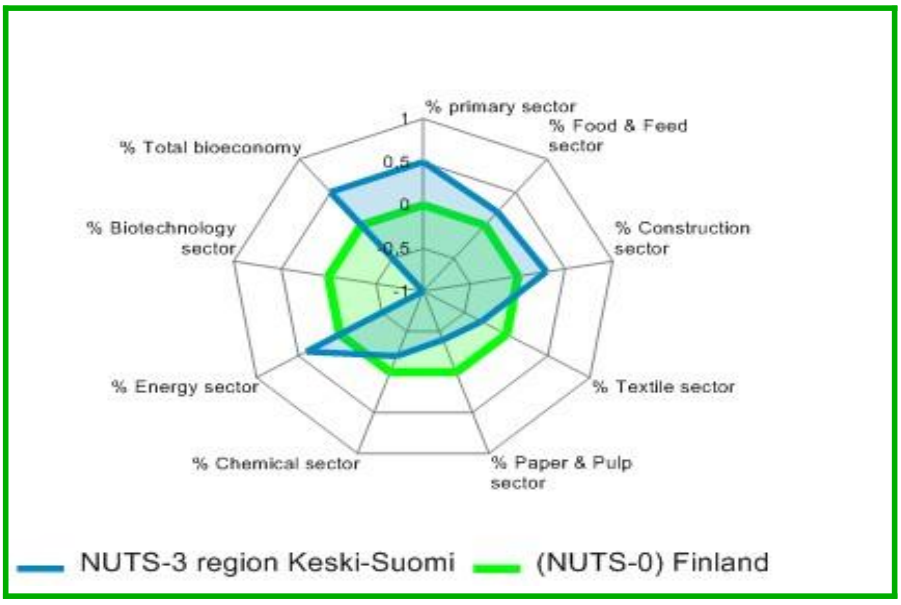


Figure 4.13 Firm structure (%) in Keski-Suomi in 2013 compared to (NUTS-0) Finland



Assessment of the qualitative indicators

Table 4.10 Scores for qualitative indicators of the bioeconomy cluster in the energy sector in Keski-Suomi

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	strong
Cluster management	Presence of a RIS3 with bioeconomy focus	strong
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	strong
	Commitment of regional policy makers and regional biocluster policy	strong
	Presence of an incubator	moderate
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	strong
	Presence of an innovative milieu directed at the bioeconomy cluster	strong
Attractiveness of region	Attractiveness of region as place to settle for entrepreneurs and researchers	strong
Availability of funding	Access to public funds	strong
	Access to private funds	strong

Recommendations for the further development of the bioeconomy cluster in Keski-Suomi
In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector. Figure 4.12 and 4.13 show that the size of the energy and paper & pulp sectors in Keski-Suomi are about at the same level as the national average and that the textiles and chemical sectors are smaller. It appears that these sectors indeed serve as starting points for the bioeconomy cluster in Keski-Suomi.

The analysis of the bioeconomy cluster in Keski-Suomi shows that entrepreneurs, R&D institutes and policymakers actively and successfully cooperate in developing and marketing bioeconomy products and that they have established an innovative milieu for bioeconomy activities. As such it can be said that the bioeconomy cluster in Keski-Suomi functions as a Good Practice. In order to develop the bioeconomy cluster further, entrepreneurs, R&D institutes and policymakers should continue with this fruitful cooperation by focusing continuously on developing new technical knowledge, adopting innovations, and adapting to changing local and global circumstances. From the analysis of the bioeconomy cluster in Keski-Suomi also a number of issues have been identified, that need some specific attention:

- ensure that the role of the cluster coordinator (which was performed until 2013 by Jyvaskyla Innovation) is sustained and reinforced to keep momentum of the cluster;
- enrich service orientation towards the companies in the cluster. This could include, for example, training courses; understanding and promotion of sustainability and resource efficiency principles and metrics; networking events such as conferences; coaching with regard to inter-cluster cooperation; informing cluster members about changes in regulations; informing cluster members about calls for proposals for subsidies and grants, etc.;
- design and reinforce educational programmes to raise interest for bioeconomy activities among students;
- perform gap analysis on skills from an industrial perspective and work together to integrate courses and human resources to the particular sectors of interest;
- improve the role of an incubator in the bioeconomy cluster;
- place effort and funds towards reinforcing the road and rail infrastructure for supply of biomass resources;
- improve the resource efficient exploitation of wood industry raw material side streams and the integration of waste in the bioeconomy value chains;
- strengthen the international contacts of the cluster.

4.1.3.5.3 Straubing: key issues of the regional profile

Brief description of the bioeconomy cluster in Straubing
The Straubing-based cluster "Renewable Raw Materials" was initiated in 2009 as a politically-led top-down initiative. The cluster is managed by the BioCampus Straubing GmbH, which closely works together with the Competence Centre for Renewable Raw Materials in Straubing. The cluster aims to transform biomass resources into competitive biobased products in the energy and chemical sectors. The cluster is located in an agriculture and forestry-rich region and there is a direct inland waterway access via the Danube port which connects the region with both Eastern and Western Europe. The port of Straubing is specialized in biomass handling and freight. The Straubing cluster currently has approximately one hundred members with the majority being from the private sector. However, entrepreneurs do not actively participate in the cluster and their appreciation of what the cluster could do for them to enforce their business is apparently broadly lacking. The Biocampus Straubing GmbH, that has the role of cluster management, is mainly oriented at research and education and the transfer of these results into industrial applications and services via networking. At the moment, it does not actively provide support for fund raising to the cluster members. The cluster lacks financial stability: until now it only received temporary and limited project funding from EU, national, regional and local funds.

Barriers for the development of the bioeconomy clusters in Straubing
The bioeconomy clusters in Straubing face a number of barriers. These include:

- lack of active participation of entrepreneurs in the cluster as they insufficiently appreciate the cluster due to its top-down character;
- R&D actors are not always able to translate research results into business applications;
- repeatedly comparatively high prices for biomass resources for bioeconomy purposes due to competition with other users of biomass resources;
- farmers lack an incentive to sell their biomass resources to bioeconomy firms;
- lack of an innovation culture among entrepreneurs;
- low prices for fossil fuels hamper the commercial drive to develop and market biofuels;
- lack of support to the cluster members by the cluster management in getting access to funding;
- lack of consistent, reliable funding of the cluster management;
- the perspective of the biocluster is rather regional in terms of business development; there is however project work and networking with relevant partners in Europe, especially along the Danube region.

Regional structure

Table 4.11 Indicators describing the potential bioeconomy in Straubing in 2013 compared to (NUTS-0) Germany average

Criteria	Indicator	Straubing region	(NUTS-0) Germany	Straubing region (z scores)[1]
Land use	Forestry land [% of total land area]	24,7	3,8	0,8
	Agricultural & horticultural land [% of total land area]	61,0	47,7	0,3
Biomass availability	Agricultural biomass production [kg/capita]	2,85	1,09	0,6
	Blue biomass production [kg/capita]	0,00	0,00	0,0
	Forestry biomass production [kg/capita]	10,53	0,94	0,8
	Waste production [kg/capita]	0,46	0,01	0,9
Innovation	SME birth rate [% of total firms in region]	17,8	20,6	0,0
	R&D expenditure [index (EU=1)]	0,54	1,22	0,0
Employment structure	R&D employment [% of total employment in	?	2,2	?
	Employment in total bioeconomy sectors [% of total employment in region]	8,6	8,2	0,1
	Employment in chemical sector [% of total employment in region]	0,0	1,0	0,0
	Employment in energy sector [% of total employment in region]	0,0	-	0,0
	Employment in paper & pulp sector [% of total employment in region]	0,0	0,3	0,0
	Employment in textile sector [% of total employment in region]	0,0	0,2	0,0
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	35,9	14,9	0,6
	Firms in chemicals sector [% of total firms in	0,0	0,0	0,9
	Firms in energy sector [% of total firms in region]	0,2	1,7	0,0
	Firms in paper & pulp sector [% of total firms in	0,0	0,0	0,0
	Firms in textile sector [% of total firms in region]	0,0	0,0	0,0
Demographics	Population growth [% year in region]	0,1	0,0	0,7
	Population 15-65 years [% of total population in region]	67,4	66,2	0,1
	GDP (PPP) [index (EU=1)]	125,00	123,00	0,1
Quality of workforce	Secondary & Tertiary education [% of total population in region]	86,7	83,0	0,1

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average (corrected for standard deviation).

Figure 4.14 Bioeconomy Readiness for Straubing in 2013 compared to (NUTS-0) Germany

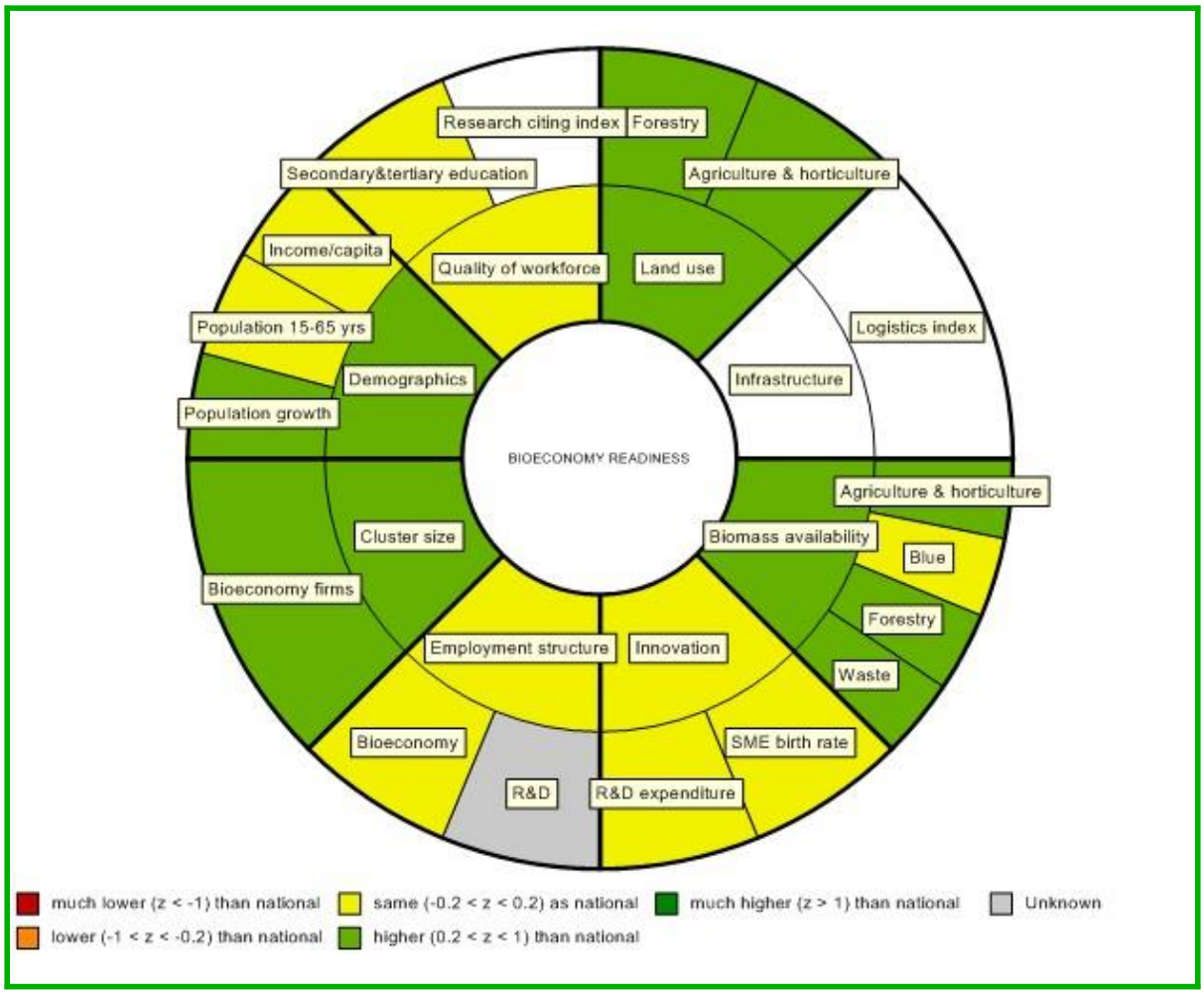
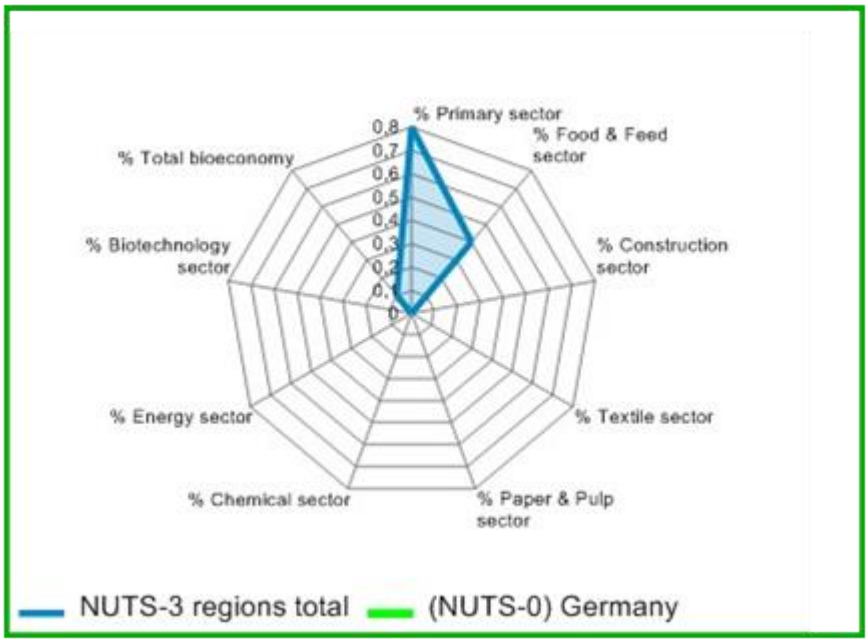
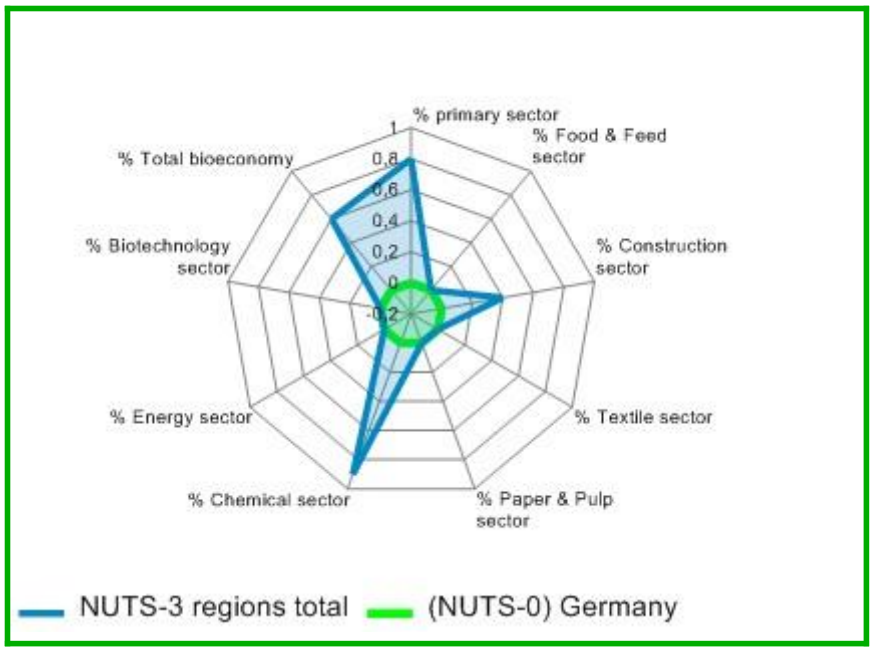


Figure 4.15 Employment structure (%) in in Straubing in 2013 compared to (NUTS-0) Germany[1)]



1) *At the NUTS3 German level, there is only employment data available for the primary sector and food & feed sector.*

Figure 4.16 Firm structure (%) in Straubing in 2013 compared to (NUTS-0) Germany



Assessment of the qualitative indicators

Table 4.12 Scores for qualitative indicators of the bioeconomy cluster in the energy and chemical sectors in Straubing

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	moderate
Cluster management	Presence of a RIS3 with bioeconomy focus	moderate
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	moderate
	Commitment of regional policy makers and regional biocluster policy	moderate
	Presence of an incubator	moderate
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	moderate
	Presence of an innovative milieu directed at the bioeconomy cluster	weak
Attractiveness of region	Attractiveness of region as place to settle for entrepreneurs and researchers	moderate
Availability of funding	Access to public funds	moderate
	Access to private funds	weak

Recommendations for the further development of the bioeconomy cluster in Straubing

In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector. Figures 4.15 and 4.16 show that the size of the chemical sector in Straubing is above the national average and its paper & pulp, textile and energy sectors about similar. This makes all four sectors good starting points for developing a bioeconomy cluster. It appears that the energy and chemical sectors have been used as starting point for the bioeconomy cluster in Straubing.

From the analysis of the qualitative indicators above a number of weaknesses appeared:

- absence of an innovative milieu directed at the bioeconomy cluster;
- difficulties in the supply of biomass resources, such as varying quality, fluctuations in the supply, the collection of the supply from a large number of suppliers, and competition with other users;
- difficulties in getting access to public and private funds.

These weaknesses can mainly be related to the perceived barriers for the development of the bioeconomy cluster in Straubing of lack capacity of entrepreneurs to participate in the cluster and an insufficient appreciation of the cluster by entrepreneurs due to its top-down character. Given these weaknesses it could be recommended to make efforts:

- to strengthen the entrepreneurial climate by improving the capacity of the entrepreneurs;
- to improve the translation of research results into business application;
- to solve bottlenecks in the supply of biomass resources as much as possible;
- to improve access to public funding, including support in completing applications and funding for start-ups;
- to focus on national and international cooperation as well.

4.1.3.5.4 Bio Base Westland: key issues of the regional profile

Brief description of the bioeconomy cluster in Biobase Westland (Delft en Westland)
The Westland region is a main centre of greenhouse horticulture. The municipality of Westland took the initiative to start a biobased cluster in 2013 with the intention to use residue materials from greenhouse horticulture such as stems, leaves and class 3 products, and to grow new crops with valuable ingredients. The municipality chairs the steering committee of Biobase Westland. Financing originates from regional, national and EU public funds. Biobase Westland experiences difficulties in finding entrepreneurs who are willing to develop and market bioeconomy products based on horticultural waste. One of the few projects of Biobase Westland so far was bringing together a group of actors, who developed and produced cardboard boxes from tomato stems. The supply of horticultural biomass is rather scattered, as it originates from many glasshouses.

Barriers for the development of the bioeconomy clusters in Biobase Westland (Delft en Westland)
The bioeconomy clusters in Delft en Westland face a number of barriers. These include:

- the bioeconomy cluster is set up as a top-down initiative in an environment of entrepreneurs of which only a small group is active in the biobased economy;
- lack of active participation of entrepreneurs in the cluster;
- the potential of horticultural crops as input for competitive bioeconomy products is not widely known among entrepreneurs in cosmetics and pharmacy;
- difficulties in the supply of biomass resources, such as varying quality, fluctuations in the supply, and the collection of the supply from a large number of suppliers.

Regional structure

Table 4.13 Indicators describing the potential bioeconomy in Delft en Westland in 2013 compared to (NUTS-0) Netherlands average

Criteria	Indicator	Delft en Westland	(NUTS-0) Netherlands	Delft en Westland (z-scores[1])
Land use	Forestry land [% of total land area]	0,0	0,2	-0,8
	Agricultural & horticultural land [% of total land area]	42,8	47,1	-0,3
Biomass availability	Agricultural biomass production [kg/capita]	5,03	1,14	4,5
	Blue biomass production [kg/capita]	0,00	0,02	-0,4
	Forestry biomass production [kg/capita]	0,01	0,06	-0,9
	Waste production [kg/capita]	1,34	0,29	4,4
Innovation	SME birth rate [% of total firms in region]	10,1	10,6	-0,4
	R&D expenditure [index (EU=1)]	0,48	0,44	0,5
Employment structure	R&D employment [% of total employment in region]	0,4	0,3	0,6
	Employment in total bioeconomy sectors [% of total employment in region]	19,5	11,5	2,1
	Employment in chemical sector [% of total employment in region]	1,3	1,4	-0,1
	Employment in energy sector [% of total employment in region]	0,7	0,5	0,5

	Employment in paper & pulp sector [% of total employment in region]	0,5	0,8	-0,7
	Employment in textile sector [% of total employment in region]	0,1	0,2	-0,8
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	23,3	16,0	1,5
	Firms in chemicals sector [% of total firms in region]	0,1	0,2	-1,0
	Firms in energy sector [% of total firms in region]	0,0	0,1	-0,3
	Firms in paper & pulp sector [% of total firms in region]	0,4	0,5	-1,3
	Firms in textile sector [% of total firms in region]	0,2	0,3	-1,4
Demographics	Population growth [% year in region]	0,4	0,4	0,2
	Population 15-65 years [% of total population in region]	68,9	66,0	1,6
	GDP (PPP) [index (EU=1)]	128,00	129,00	-0,1
Quality of workforce	Secondary & Tertiary education [% of total population in region]	75,4	75,8	-0,2

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average.

Figure 4.17 Bioeconomy Readiness for Delft en Westland in 2013 compared to (NUTS-0) Netherlands

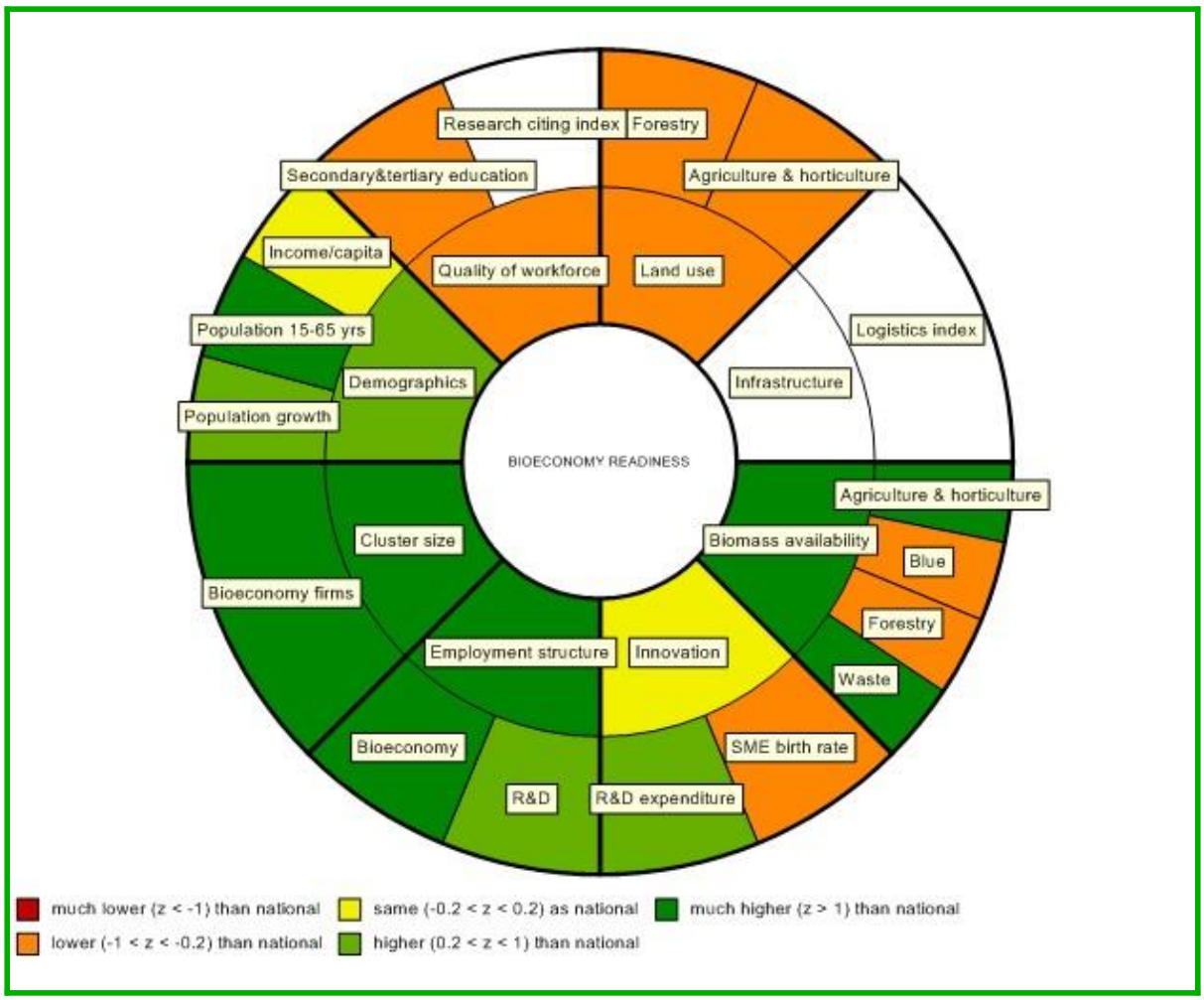


Figure 4.18 Employment structure (%) in Delft en Westland in 2013 compared to (NUTS-0) Netherlands

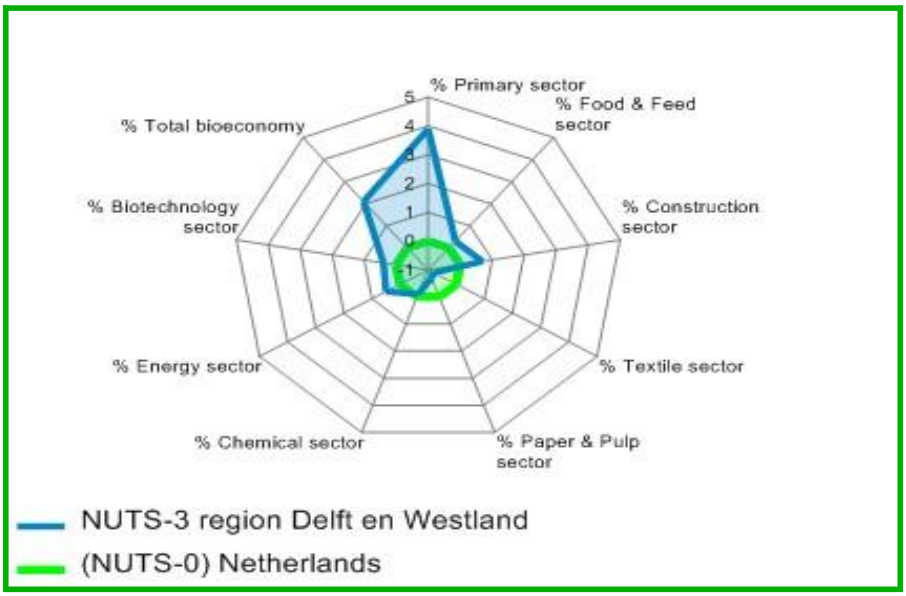
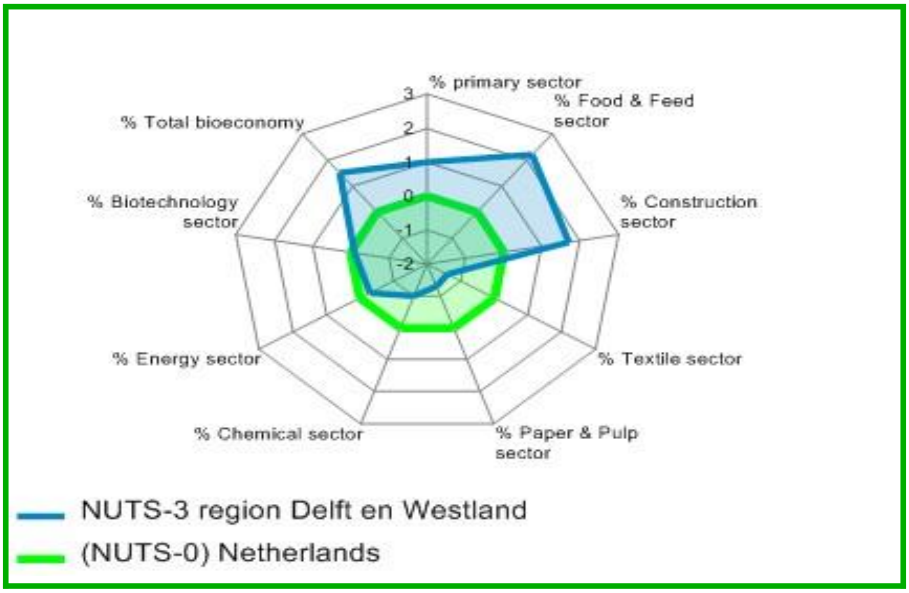


Figure 4.19 Firm structure (%) in Delft en Westland in 2013 compared to (NUTS-0) Netherlands



Assessment of the qualitative indicators

Table 4.14 Scores for qualitative indicators of the bioeconomy cluster of Bio Base Westland

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	moderate
Cluster management	Presence of a RIS3 with bioeconomy focus	moderate
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	weak
	Commitment of regional policy makers and regional biocluster policy	moderate
	Presence of an incubator	weak
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	weak
	Presence of an innovative milieu directed at the bioeconomy cluster	weak
Attractiveness of region	Attractiveness of region as place to settle for entrepreneurs and researchers	moderate
Availability of funding	Access to public funds	moderate
	Access to private funds	weak

Recommendations for the further development of the bioeconomy cluster Biobase Westland
In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector. Figures 4.18 and 4.19 show that the size of the energy sector in Delft en Westland is above the national average and its paper & pulp, textiles and chemical sectors smaller. This makes the energy sector a good starting point for developing a bioeconomy cluster. Biobase Westland has not yet made a choice to identify one economic sector that acts as starting point for the bioeconomy cluster: until now it has been tried to contact actors in many economic sectors in order to stimulate them to start biobased activities. These attempts resulted in a biobased cardboard boxes project in the paper and pulp sector. Nevertheless, it seems yet too early to speak of a paper & pulp bioeconomy cluster in Biobase Westland If Biobase Westland would make a choice for a sector in which to start the bioeconomy cluster, given its relatively strength the energy sector would be a preferable starting point.
From the analysis of the qualitative indicators above a number of weaknesses appeared:

- policy makers are the driving forces behind the cluster organization which coordinates, manages and facilitates the bioeconomy cluster;
- absence of an innovative milieu directed at the bioeconomy cluster;
- difficulties in the supply of biomass resources, such as varying quality, fluctuations in the supply, and the collection of the supply from a large number of suppliers;
- difficulties in getting access to public and private funds.

These weaknesses can be related to the perceived barriers for the development of Biobase Westland in an environment of entrepreneurs and R&D institutes which are not convinced of its usefulness and who show a low sense of ownership of the cluster due to the fact that it is a politically top-down initiative. In addition to these weaknesses, there are two other concerns that affect our recommendations for the further development of Biobase Westland. First, Biobase Westland focusses on opportunities for biobased products in too many economic sectors and lacks an anchoir point in one economic sector. Second, Biobase Westland operates at the municipality level belonging to a region already covered by the bioeconomy activities of Biobased Delta. Hence the added value of Biobase Westland to the bioeconomy in the south-western part of the Netherlands could be wondered. The idea behind a bioeconomy cluster is that entrepreneurs, R&D institutes and policy makers cooperate in achieving a well-developed regional bioeconomy. Given the weaknesses of Biobase Westland, its lack of focus at one economic sector and the existence of Biobased Delta at the regional level, it could be recommended to join forces with Biobased Delta. In addition, it could be recommended:

- to set up an entrepreneurs platform to involve more entrepreneurs in the bioeconomy;
- to put efforts in promoting the potential of horticultural products as a base for competitive bioeconomy among entrepreneurs.

4.1.3.5.5 Biobased Delta: key issues of the regional profile

Brief description of the bioeconomy cluster Biobased Delta
Biobased Delta is located in the provinces Zeeland, West-Brabant and South Holland. It was formed from a merger between regional clusters in Zeeland and West-Brabant in 2012. South Holland joined in 2014. Biobased Delta is located in the Antwerp - Rotterdam - Rhine - Ruhr Area, which is the world's biggest chemical cluster. The area is a frontrunner in the field of sustainability, though sustainable biobased chemistry activities are still in their infancy compared to traditional oil based chemistry which they aim to (partially) replace. Unlike oil extraction, refining and conversion, the agro and chemistry sectors historically have little common ground on which to build new activities. The region has extensive agriculture and horticulture activity. For example, in the Netherlands around one million tons of sugar beet pulp remains annually after the production of beet sugar, and about half of this is produced in the Biobased Delta region. Biobased Delta aims to use locally-produced biomass where possible, although imported biomass will also have a role, and may be essential if operations are scaled-up. Biomass will be imported via the internationally significant sea ports located in the region.

Biobased Delta consists of several Biobased clusters. The "Sugar" cluster aims to promote refining and conversion of biomass to chemicals, including bulk, platform and specialty chemicals, fuels and polymers. Biobased Delta is a leading European cluster in this sector, largely thanks to the presence of strong chemical industry and primary sectors within the host regions. The feedstock for the sugar can stem from sugar beets, woodchips, cereals and potatoes. This cluster focuses primary on medium sized and large companies.

Besides the sugar cluster, there are Biobased clusters organized around specific applications, technologies and feedstocks. In these clusters SME companies are often the dominant factor. Examples of these clusters are pyrolysis, packaging, infra, macro and micro algae, natural colorants, fibers and aromatics. These clusters tend to be more regional oriented but are not limited to the Biobased Delta region. The Biobased Delta organization and its partners support the clusters with top locations, business development, human capital agenda, communication/internationalization and funding.

Biobased Delta is moving from the initial phase to the drive to maturity phase. In the initial phase the following instruments were very important:

- a national subsidy program "Pieken in de Delta", which allowed us to explore the regional potential of biobased economy and fund the first pilot projects;
- development of a triple helix agenda on Biobased Economy, called "agro meets chemistry";
- the commitment of regional government and the translation thereof in the first tranches of funds for developing the cluster organization, clusters and projects;
- the establishment of the foundation Biobased Delta and the branding of BbD.

The following instruments and measures are implemented to enter the drive to maturity phase:

- developing an industry-led agenda with business developers;
- reinforcing and connecting the ecosystem for SME companies. This consist of applications centers, campuses, a human capital agenda, business development by regional development companies and funding schemes;
- stronger focus on European funds, in particular H2020 (including BIC) and structure funds (Interreg, OP-Zuid), facilitating the process;
- introduction of a membership model – contribution from participants for services by the cluster organisation.

Barriers for the development of the bioeconomy cluster Biobased Delta

The bioeconomy cluster Biobased Delta faces a number of barriers. These include:

- it is often difficult to manage expectations regarding the development of the biobased economy, in particular the time involved to achieve maturity;
- bridging the cultural differences between the agro and chemistry sectors;
- relatively little initiative from the traditional, fossil based, chemical industry towards biobased solutions amongst others due to the low oil prices and the fact that there is no market premium for Biobased products;
- long time to market. In particular, the development of new technology is time consuming and the outcome thereof is uncertain;
- sufficient capital for high risk (seed) investments in infrastructures (equipment, storage, handling, etc.) is required to support future development of large scale biobased activities. One example that is currently explored is the refinery of sugars from woody biomass;
- lacking of funding for de-risking;
- the SDE subsidy (acronym translation: 'stimulation of sustainable energy production') by the Ministry of Economic Affairs has a strong negative impact on the (potential) use of biomass for higher value biobased applications than energy production;
- reinforcement of trans-regional and international perspectives would expand business development prospects.

Regional structure

Table 4.15 Indicators describing the potential bioeconomy in Biobased Delta in 2013 compared to (NUTS-0) Netherlands average

Criteria	Indicator	Biobased Delta	(NUTS-0) Netherlands	Biobased Delta (z-scores[1])
Land use	Forestry land [ha/1000 capita]	0,98	0,50	0,6
	Agriculture & horticulture land [ha/1000 capita]	0,85	0,12	4,9
Biomass availability	Agricultural biomass production [kg/capita]	1,73	1,14	0,7
	Blue biomass production [kg/capita]	0,11	0,02	1,5
	Forestry biomass production [kg/capita]	0,02	0,06	-0,7
	Waste production [kg/capita]	0,46	0,29	0,7
Innovation	SME birth rate [% of total firms in region]	10,0	10,6	-0,5
	R&D expenditure [index (EU=1)]	0,35	0,44	-1,0
Employment structure	R&D employment [% of total employment in region]	0,1	0,3	-1,4
	Employment in total bioeconomy sectors [% of total employment in region]	15,2	11,5	1,0
	Employment in chemical sector [% of total employment in region]	3,1	1,4	1,5
	Employment in energy sector [% of total employment in region]	0,6	0,5	0,3
	Employment in paper & pulp sector [% of total employment in region]	0,9	0,8	0,4
	Employment in textile sector [% of total employment in region]	0,2	0,2	-0,2
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	18,5	16,0	0,5
	Firms in chemicals sector [% of total firms in region]	0,2	0,2	0,7
	Firms in energy sector [% of total firms in region]	0,1	0,1	0,1
	Firms in paper & pulp sector [% of total firms in region]	0,5	0,5	-0,6
	Firms in textile sector [% of total firms in region]	0,4	0,3	0,8
Demographics	Population growth [% year in region]	0,2	0,4	-0,4
	Population 15-65 years [% of total population in region]	64,7	66,0	-0,7
	GDP (PPP) [index (EU=1)]	128,34	129,00	-0,1
Quality of workforce	Secondary & Tertiary education [% of total population in region]	73,1	75,8	-1,6

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average (corrected for standard deviation).

Figure 4.20 Bioeconomy Readiness for Biobased Delta in 2013 compared to (NUTS-0) Netherlands

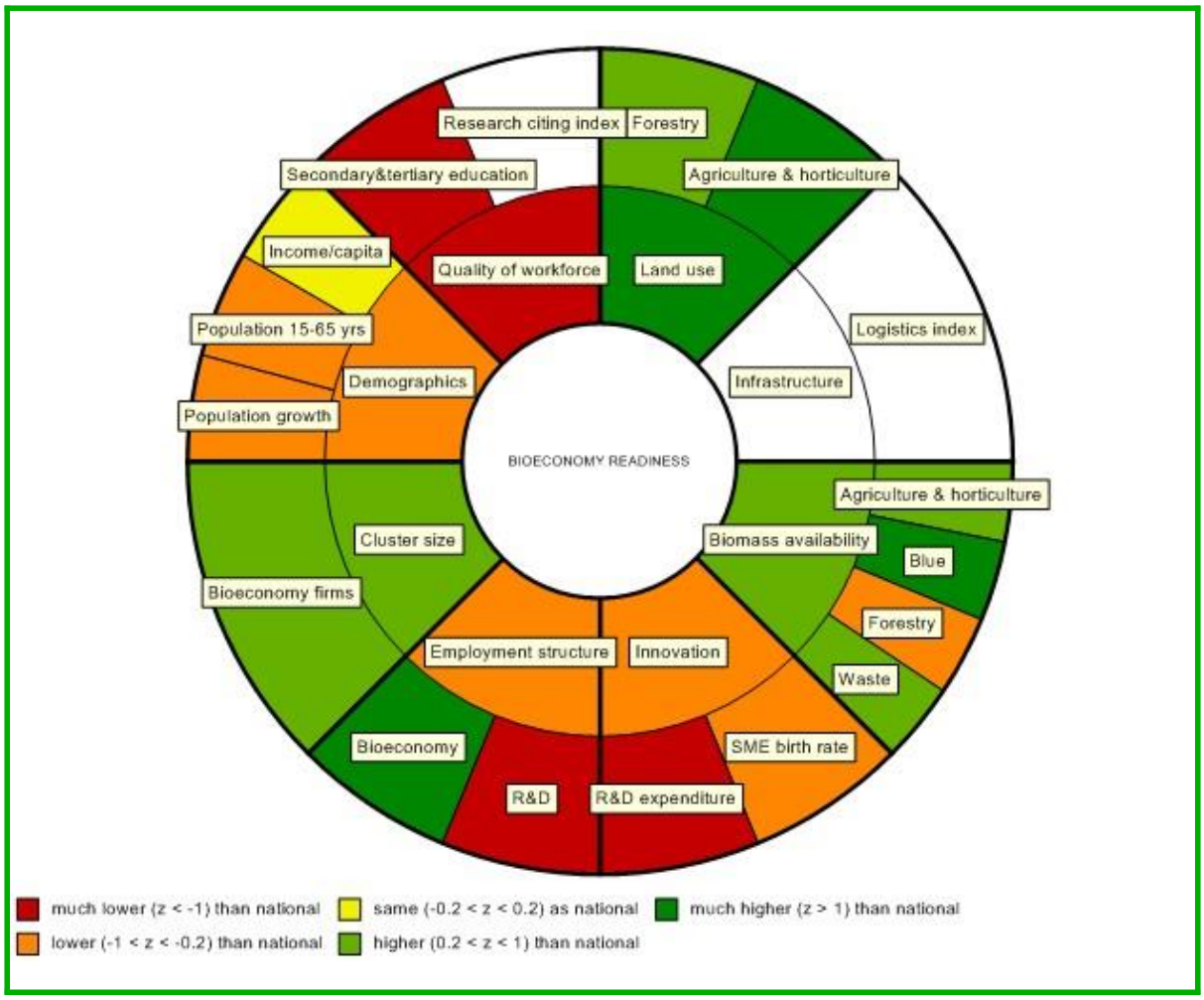


Figure 4.21 Employment structure (%) in Biobased Delta in 2013 compared to (NUTS-0) Netherlands

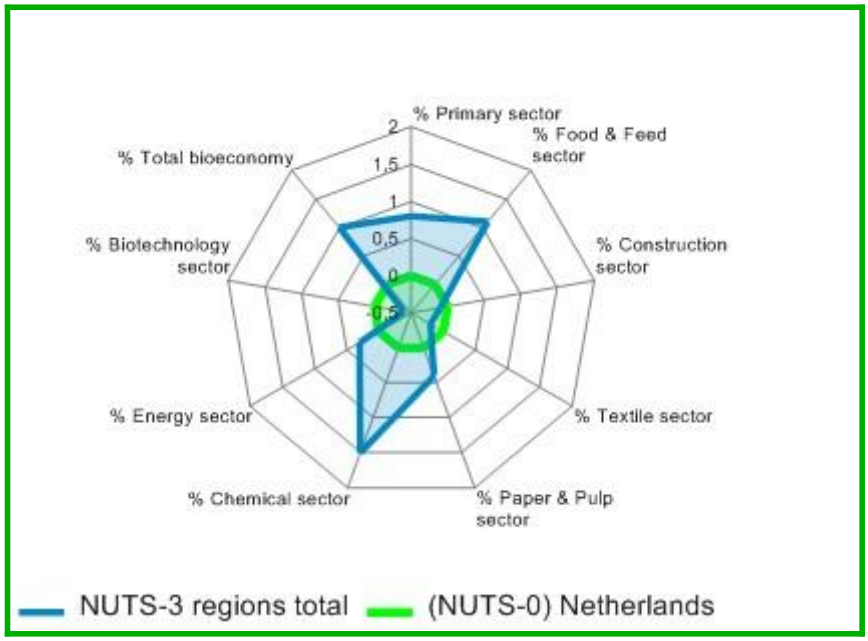
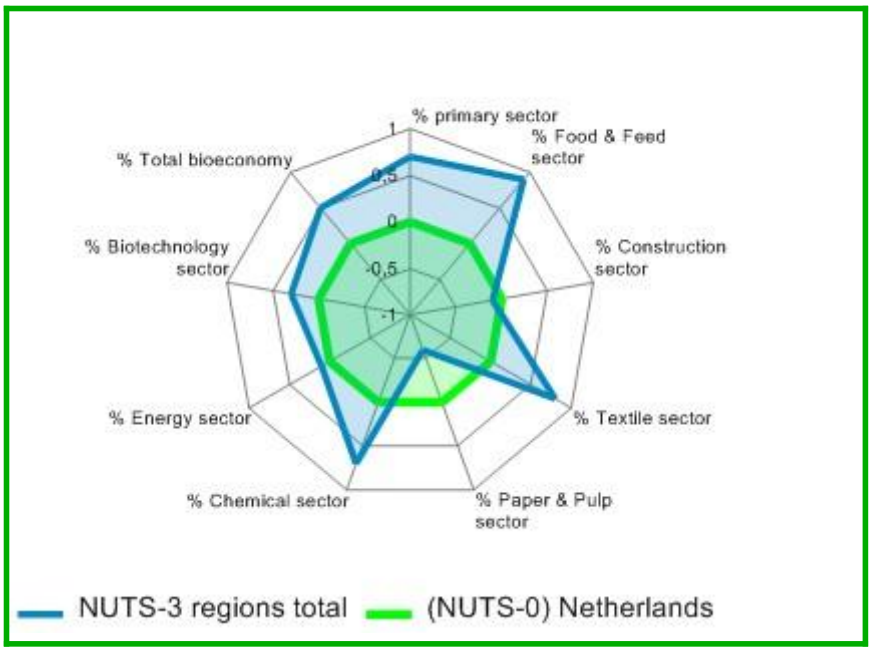


Figure 4.22 Firm structure (%) in Biobased Delta in 2013 compared to (NUTS-0) Netherlands



Assessment of the qualitative indicators

Table 4.16 Scores for qualitative indicators of the bioeconomy cluster in the chemical sector in Biobased Delta

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	moderate
Cluster management	Presence of a RIS3 with bioeconomy focus	moderate
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	moderate
	Commitment of regional policy makers and regional biocluster policy	strong
	Presence of an incubator	moderate
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	moderate
	Presence of an innovative milieu directed at the bioeconomy cluster	moderate
Attractiveness of region	Attractiveness of the region as a place to settle for entrepreneurs and researchers	moderate
Availability of funding	Access to public funds	moderate
	Access to private funds	moderate

Recommendations for the further development of the bioeconomy cluster Biobased

In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector (Figure 4.5). From the analysis above we have seen that the size of the chemical and energy sector in Biobased Delta and its paper & pulp and textile sectors about similar to the national average. This makes either the chemical or the energy sector good starting points for developing a bioeconomy cluster. It appears that Biobased Delta has opted for starting the bioeconomy cluster in the chemical sector by developing an agenda based on sugar from agro (rest)streams and woodchips to chemicals. Besides that BBD has a regional MKB agenda for Biobased products towards various sectors (for instance building, chemical, paper and pulp, food).

From the analysis of the qualitative indicators above a number of weaknesses appeared:

- presence of continuous supply of biomass with constant quality;
- Biobased Delta scores relatively low on R&D employment and R&D expenditure in general,
- policy makers were initial the driving forces behind the cluster organization which

coordinates, manages and facilitates the bio economy cluster;
- while the take-off the bio economy will take longer Biobased Delta faces the challenge of getting enough access to public and private funds.

The weaknesses concerning the availability of a continuous supply of biomass resources with a constant quality is a challenge also faced in the Good Practice regions. Biobased Delta's strategy is to focus on the big feedstock in the area (sugar beets, potatoes, cereals) and use the well positioned harbors for importing biobased feedstock (for instance wood chips).

From the analysis it appeared that R&D spending is relatively low in Biobased Delta. This is partly due to the lack of universities in Biobased Delta. However Biobased Delta is working together with strong universities in surrounding regions like Wageningen UR, University of Gent, Technical university Delft. Biobased Delta has a on an applied science level a strong Center of Expertise Biobased Economy powered by Avans Hogeschool and HZ University of Applied Science. Biobased Delta is working together with knowledge institutes like VITO, TNO and ECN.

While it is often the case that policy makers are the driving force in the initial take of phase, companies were more in the lead in the drive to maturity phase.Biobased Delta is entering the drive to maturity phase. The fact that the time to market for biobased products takes longer than expected, this requires more private and public funding. These combined factors ask for more focus on an industry-led agenda and on access to private and public funds. The roadmap for Biobased Delta focuses on those issues.

Until now Biobased Delta has functioned rather as a platform that provides focus to the bioeconomy activities in the region by organizing the common agenda 'Agro meets Chemistry', in which many R&D institutes and firms in the region express their willingness to participate in bioeconomy activities, and as broker who connects actors at their own request to other actors. Given these findings, it could be recommended that Biobased Delta makes efforts to strengthen its role of a platform that provides focus to the bioeconomy activities in the region and its role as broker who connects actors at their own request to other actors.

4.1.3.5.6 Madrid region: key issues of the regional profile

Brief description of the bioeconomy cluster in Madrid Region
The Regional Government of the Community of Madrid founded eleven clusters in 2007 for economic sectors which they identified as strategic for Madrid. Two of them refer to bioeconomy clusters: the biotechnology cluster and the renewable energy cluster. The clusters share the same organizational structure, with the Regional Government represented in the Board of Directors. In order to minimize costs and leverage the common synergies, back-office activities are undertaken by the common umbrella organization 'Madrid Network'. From the start of the clusters, policymakers, R&D institutes and firms were involved. Firstly, especially large companies were participating; later SME joined as well. Initially, the cluster board was financed by public funds; later by private funds. The renewable energy cluster benefits from the supply of forest biomass resources from nearby regions, for which there are hardly competing users, and from urban solid waste from Madrid. The main focus of this cluster is on converting biomass into energy products such as biofuel and pellets both for consumption within the Madrid region and for exports. Due to the policy top-down driven nature of the clusters, R&D institutes and entrepreneurs are less active and show a waiting attitude. Moreover, differences in culture hamper collaboration of R&D actors and entrepreneurs. In the biotechnology cluster the proximity of firms in the Science Park encourages mutual cooperation. The clusters respond actively to items on the regional political agenda, such as tax incentives for companies with R&D activities in bioeconomy, promotion of infrastructures dedicated to R&D in biotechnology, soft credits for start-ups in the biotech and renewable energy sector and incentives to promote domestic use of biomass boilers, as well as to the EU renewable energy policy. The clusters respond actively to items on the regional political agenda, such as tax incentives for companies with R&D activities in bioeconomy, promotion of infrastructures dedicated to R&D in biotechnology, soft credits for start-ups in the biotech and renewable energy sector and incentives to promote domestic use of biomass boilers, as well as to the EU renewable energy policy.

Barriers for the development of the bioeconomy clusters in Madrid Region

The bioeconomy clusters in Madrid Region face a number of barriers. These include:

- they are set up as a politically-led top-down initiative in an environment of entrepreneurs and R&D institutes which are not convinced of its usefulness and who show a low sense of owners of the cluster;
- a lack of active participation of entrepreneurs in the cluster;
- a lack of an innovation culture among entrepreneurs;
- a lack of cooperation and trust among firms and R&D institutes.

Regional structure

Table 4.17 Indicators describing the potential bioeconomy in Madrid Region in 2013 compared to (NUTS-0) Spain average

Criteria	Indicator	Madrid Region	(NUTS-0) Spain	Madrid Region (z-scores[1])
Land use	Forestry land [% of total land area]	6,5	9,8	-0,2
	Agricultural & horticultural land [% of total land area]	42,9	49,5	-0,1
Biomass availability	Agricultural biomass production [kg/capita]	0,10	1,94	-1,3
	Blue biomass production [kg/capita]	0,00	0,04	-1,3
	Forestry biomass production [kg/capita]	0,02	0,35	-1,3
	Waste production [kg/capita]	0,02	0,34	-0,9
Innovation	SME birth rate [% of total firms in region]	8,5	9,1	0,0
	R&D expenditure [index (EU=1)]	0,47	0,35	1,5
Employment structure	R&D employment [% of total employment in region]	1,1	0,7	1,4
	Employment in total bioeconomy sectors [% of total employment in region]	13,8	19,9	-1,6
	Employment in chemical sector [% of total employment in region]	0,2	0,3	-0,5
	Employment in energy sector [% of total employment in region]	0,1	0,9	-0,7
	Employment in paper & pulp sector [% of total employment in region]	0,1	0,1	0,2
	Employment in textile sector [% of total employment in region]	0,4	0,6	-0,5
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	25,1	28,8	-0,6
	Firms in chemicals sector [% of total firms in region]	0,3	0,5	-0,9
	Firms in energy sector [% of total firms in region]	1,3	0,8	1,1
	Firms in paper & pulp sector [% of total firms in region]	1,5	1,5	0,0
	Firms in textile sector [% of total firms in region]	0,7	1,1	-0,7
Demographics	Population growth [% year in region]	1,0	0,7	0,5
	Population 15-65 years [% of total population in region]	68,4	67,1	0,8
	GDP (PPP) [index (EU=1)]	126,00	96,00	1,3
Quality of workforce	Secondary & Tertiary education [% of total population in	70,5	55,4	1,9

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average (corrected for standard deviation).

Figure 4.23 Bioeconomy Readiness for Madrid Region in 2013 compared to (NUTS-0) Spain

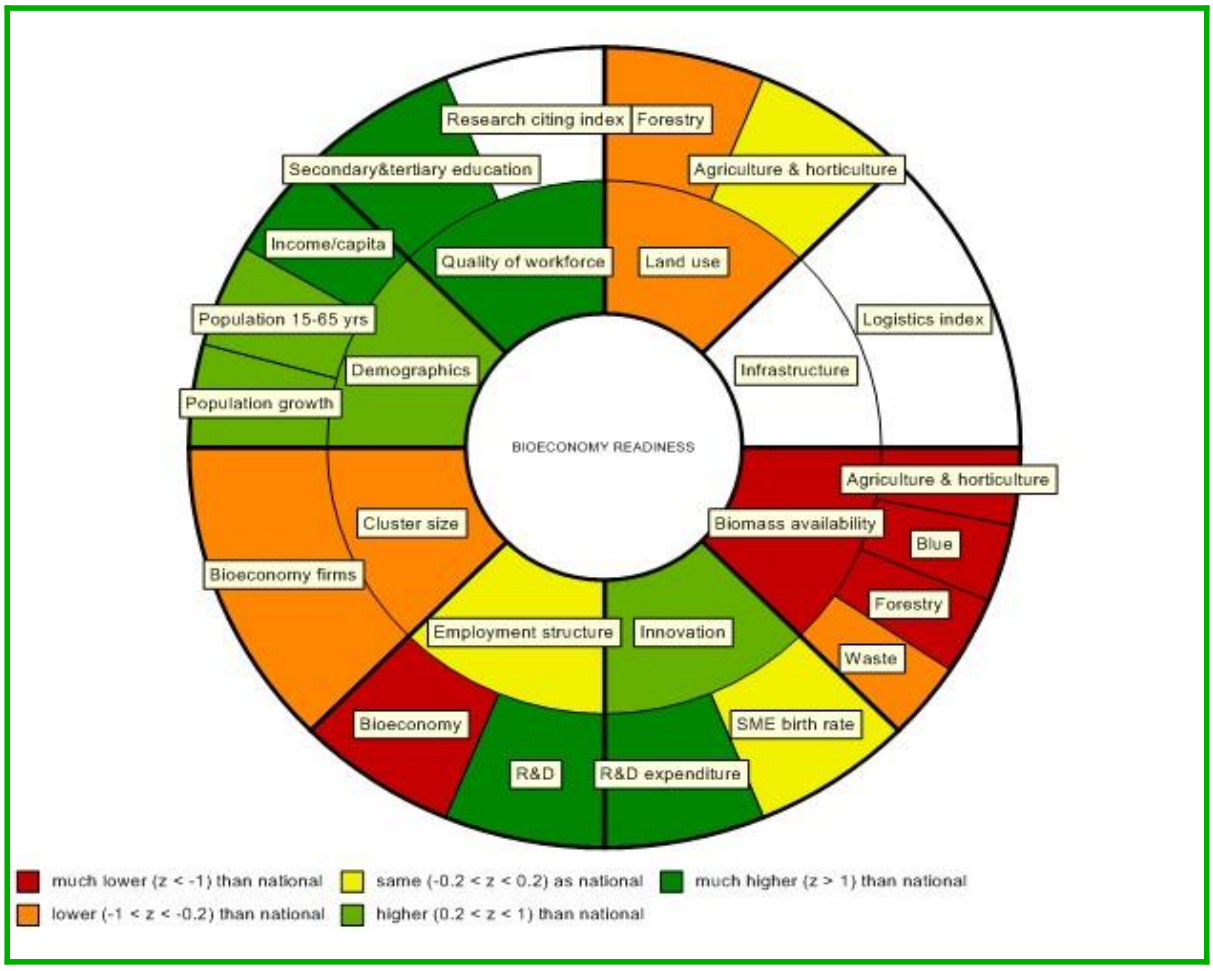


Figure 4.24 Employment structure (%) in Madrid Region in 2013 compared to (NUTS-0) Spain

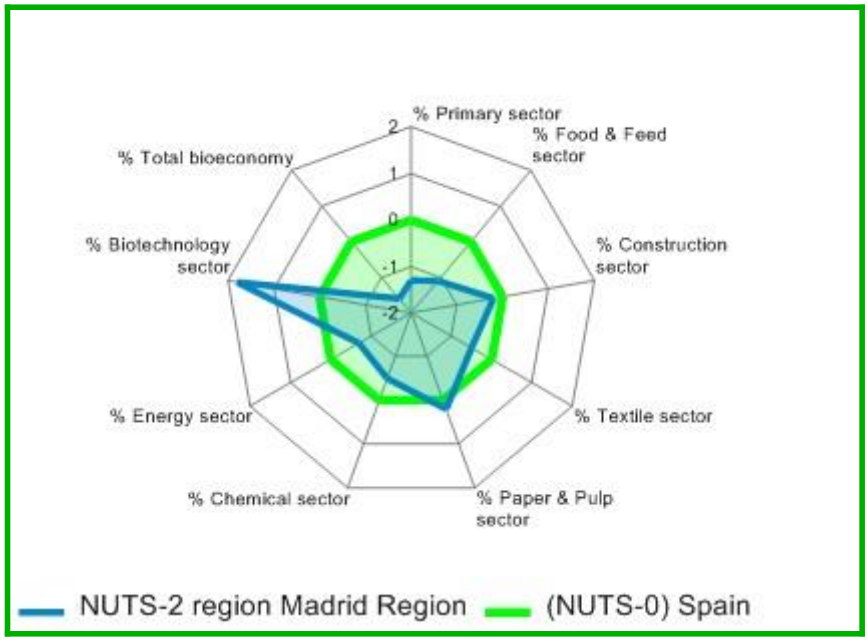
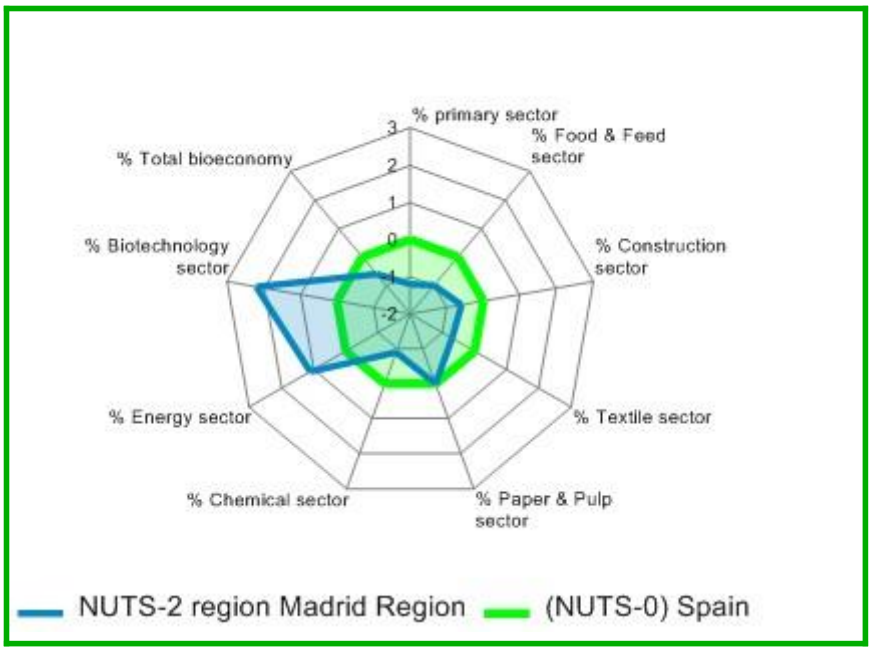


Figure 4.25 Firm structure (%) in Madrid Region in 2013 compared to (NUTS-0) Spain



Assessment of the qualitative indicators

Table 4.18 Scores for qualitative indicators of the bioeconomy cluster in the energy sector in Madrid region

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	strong
Cluster management	Presence of a RIS3 with bioeconomy focus	weak
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	strong
	Commitment of regional policy makers and regional biocluster policy	strong
	Presence of an incubator	weak
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	weak
	Presence of an innovative milieu directed at the bioeconomy cluster	moderate
Attractiveness of region	Attractiveness of region as place to settle for entrepreneurs and researchers	moderate
Availability of funding	Access to public funds	moderate
	Access to private funds	weak

Recommendations for the further development of the bioeconomy cluster in Madrid Region

In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector. Figures 4.24 and 4.25 show that the size of the energy sector in Madrid Region is above the national average, its paper & pulp sector about similar and its textiles and chemical sectors smaller. This makes the energy sector a good starting point for developing a bioeconomy cluster. It appears that efforts in this direction have already been taken in Madrid Region.

From the analysis of the qualitative indicators above a number of weaknesses appeared:

- absence of a RIS3 with a bioeconomy focus;
- although Madrid holds a good rate of Academic institutions, R&D infrastructures, science-parks and clusters, there is not a proper bioeconomy incubator. The absence of a designated incubator could make smart specialization efforts difficult to be applicable.
- lack of integration of the bioeconomy cluster in a science/technology park;
- absence of an innovative milieu directed at the bioeconomy cluster, which could weaken the cluster implantation;
- moderate attractiveness of the region as place to settle for entrepreneurs and researchers;
- difficulties in getting access to public and private funds.

These weaknesses can be related to the perceived barriers for the development of the bioeconomy cluster in Comunidad de Madrid of lack of capacity of entrepreneurs to participate in the bioeconomy cluster and the low sense of ownership of the cluster due to the fact that it is a politically top-down initiative. Given these weaknesses it could be recommended to make efforts to strengthen the entrepreneurial climate. For doing so, improvement of the capacity of the entrepreneurs would be a useful first step. In addition, coordination among regional actors and the promotion of pilot plant installations would be useful.

4.1.3.5.7 Western Macedonia: key issues of the regional profile

Brief description of the bioeconomy cluster in Western Macedonia

The rural region of Western Macedonia in northern Greece is of national significance from the energy perspective. More than 50% of Greek electricity is produced in Western Macedonia, mostly from power plants fueled from lignite mined within the region. The contribution from renewable energy has grown in recent years. Considerable efforts have been made by the Regional Authority, research institutes and other key stakeholders to improve the policy, socio-economic and R&D landscape regarding the bioeconomy. Several bioeconomy sectors - primary biomass production, energy, textiles and clothing, food and R&D – play a significant role in the region. In 2014, a triple helix structured cluster named Cluster of Bioenergy and Environment of Western Macedonia (CluBE). was established as a non-profit company by 21 members from the public sector, R&D institutes and the private sector. It builds upon an informal collaboration of regional players in projects on bioenergy that already existed for more than ten years. In 2016 it is foreseen that its members will be increased to 40 mainly with the addition of SMEs. The focus of the cluster is on R&D and entrepreneurship in the sectors of bioenergy, energy efficiency and environment. There is a large supply of biomass in the region, including agricultural, forest and urban waste. However, due to its this diversity and the geomorphology (mountains) of the region, collection of biomass is complicated.. Financing of the Cluster's activities for the first period of operation after its establishment mainly depends on EU project funding and not yet on members' fees, which is foreseen for a later stage. The cluster mainly aims to mobilise more actors in the wider area and thus alter the dominating mentality of a lack of cooperation among stakeholders. This little receptive environment arises as the private sector lacks an innovation culture, trust and cooperation between business and academia is mainly limited to EU/national funded projects (which however are of a great importance for assisting a lot towards bridging gaps), political commitment to the cluster is rather poor, relevant legislation is rather incomplete, policy makers do not show the will and/or knowledge for pooling different policies because there is an overall lack of sector reinforcement policy, regional authorities are slightly aware of the research conducted in the region, and mutual collaboration and information regarding supply and demand of biomass resources is missing.

Barriers for the development of the bioeconomy clusters in Western Macedonia
The bioeconomy clusters in Western Macedonia face a number of barriers. These include:

- lack of active participation of entrepreneurs in the cluster;
- lack of an innovation culture among entrepreneurs;
- lack of cooperation and trust among firms and R&D institutes;
- lack of political commitment;
- difficulties in the supply of biomass resources, such as varying quality and the collection of the supply from a large number of suppliers;
- lack of funding.

Regional structure

Table 4.19 Indicators describing the potential bioeconomy in Western Macedonia in 2013 compared to (NUTS-0) Greece average

Criteria	Indicator	Western Macedonia	(NUTS-0) Greece	Western Macedonia (z scores[1])
Land use	Forestry land [% of total land area]	23,7	17,0	0,9
	Agricultural & horticultural land [% of total land area]	24,7	23,2	0,1
Biomass availability	Agricultural biomass production [kg/capita]	3,66	1,93	1,1
	Blue biomass production [kg/capita]	0,00	0,00	0,2
	Forestry biomass production [kg/capita]	0,30	0,08	2,0
	Waste production [kg/capita]	0,39	0,43	-0,3
Innovation	SME birth rate [% of total firms in region]	-	-	-
	R&D expenditure [index (EU=1)]	0,44	0,44	0,0
Employment structure	R&D employment [% of total employment in region]	0,3	0,6	-1,4
	Employment in total bioeconomy sectors [% of total employment in region]	27,9	22,3	0,5
	Employment in chemical sector [% of total employment in region]	0,0	0,9	-1,7
	Employment in energy sector [% of total employment in region]	3,1	0,8	4,9
	Employment in paper & pulp sector [% of total employment in region]	0,5	0,5	0,0
	Employment in textile sector [% of total employment in region]	1,5	0,6	2,2
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	17,6	6,7	3,0
	Firms in chemicals sector [% of total firms in region]	0,1	0,2	-1,3
	Firms in energy sector [% of total firms in region]	1,1	0,4	1,1
	Firms in paper & pulp sector [% of total firms in region]	0,0	0,1	-1,7
	Firms in textile sector [% of total firms in region]	6,5	1,0	5,2
Demographics	Population growth [% year in region]	-0,5	-0,1	-0,6
	Population 15-65 years [% of total population in region]	63,3	65,2	-1,0
	GDP (PPP) [index (EU=1)]	80,00	80,00	0,0
Quality of workforce	Secondary & Tertiary education [% of total population in region]	57,2	67,2	-1,5

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average (corrected for standard deviation).

Figure 4.26 Bioeconomy Readiness for Western Macedonia in 2013 compared to (NUTS-0) Greece

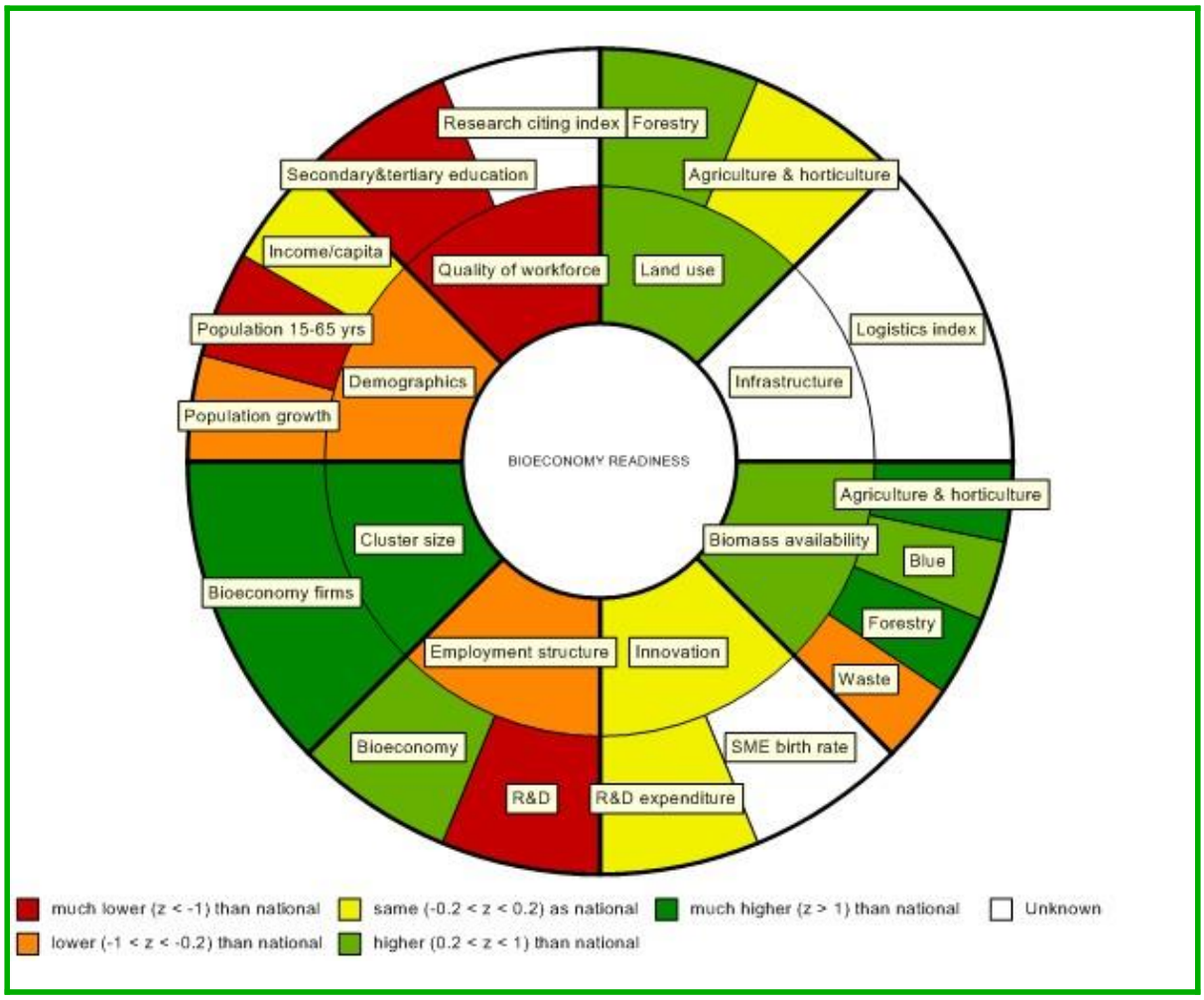


Figure 4.27 Employment structure (%) in Western Macedonia in 2013 compared to (NUTS-0) Greece

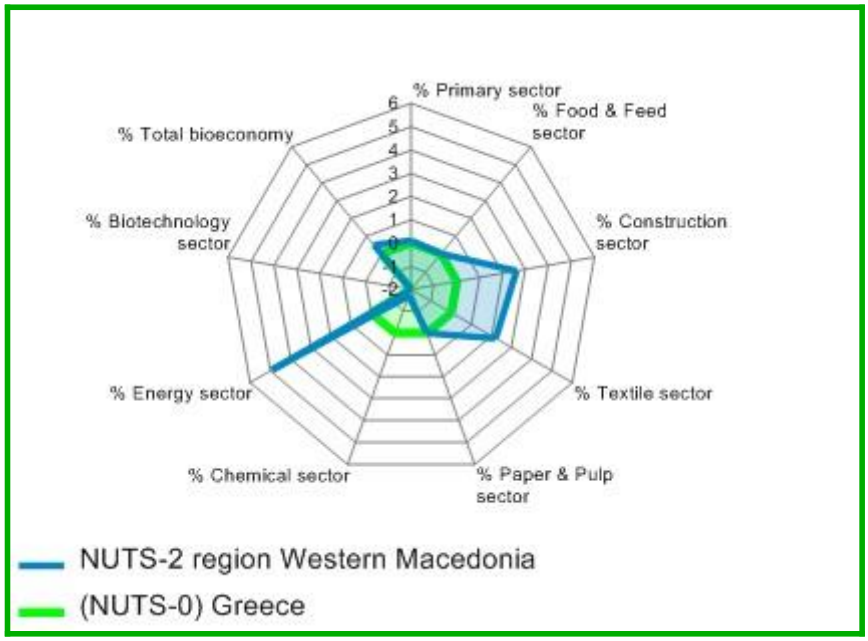
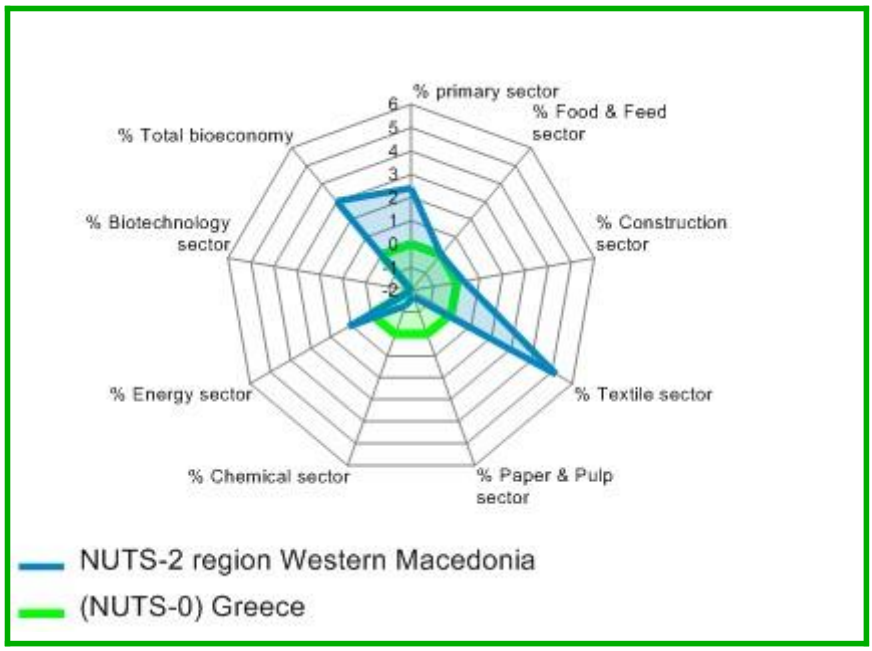


Figure 4.28 Firm structure (%) in Western Macedonia in 2013 compared to (NUTS-0) Greece



Assessment of the qualitative indicators

Table 4.20 Scores for qualitative indicators of the bioeconomy cluster in the energy sector in Western Macedonia

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	weak
Cluster management	Presence of a RIS3 with bioeconomy focus	weak
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	weak
	Commitment of regional policy makers and regional biocluster policy	weak
	Presence of an incubator	weak
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	weak
	Presence of an innovative milieu directed at the bioeconomy cluster	weak
Attractiveness of region	Attractiveness of region as place to settle for entrepreneurs and researchers	weak
Availability of funding	Access to public funds	weak
	Access to private funds	weak

Recommendations for the further development of the bioeconomy cluster in Western Macedonia

In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector. Figures 4.27 and 4.28 show that the size of the energy and textile sectors in West

Macedonia are above the national average, its paper & pulp sector about similar and its chemical sector smaller. This makes the energy and textile sectors good starting points for developing a bioeconomy cluster. It appears that CluBE has chosen to start the bioeeconmy cluster in the energy sector.

From the analysis of the qualitative indicators above a number of weaknesses appeared:

- lack of a continuous supply of biomass with constant quality;
- lack of commitment of regional policy makers and regional biocluster policy;
- absence of a RIS3 with a bioeconomy focus;
- absence of an incubator;
- lack of integration of the bioeconomy cluster in a science/technology park;
- absence of an innovative milieu directed at the bioeconomy cluster;
- ow attractiveness of the region as place to settle for entrepreneurs and researchers;
- difficulties in getting access to public and private funds.

These weaknesses can be related to the fact that the bioeconomy cluster CluBE is launched in a region in which actors seem not to be waiting for bioeconomy cluster activities. Therefore it has to be wondered whether it is useful to put any efforts in a further development of CluBe. In case CluBE might decide to continue with the further development of a bioeconomy cluster in West Macedonia, then it could be recommended to increase the capacity of local actors by learning them to cooperate, to use networks, and to assess their situation in the broader local and global context.

4.1.3.5.8 Slovenia: key issues of the regional profile

Brief description of the bioeconomy cluster in Osrednjeslovenska
In Osrednjeslovenska, two partnerships have been identified as bioeconomy clusters: the Wood Industry Cluster and the PoliMat Center of Excellence. The Wood Industry Cluster was founded as a response to national policies that encouraged the creation of clusters by seventeen woodworking companies and two higher education and research institutions in 1999. The legal form of the cluster is a non-profit organization and it has a cluster board. PoliMat was established in 2009, following a successful bid for EU funding. Members of PoliMat are four main national, public research institutions working on polymers and sixteen private firms, including the leading firms in the chemicals & polymers sector. In both clusters, research institutions played a catalytic role. A number of active research actors within PoliMat were able to attract attention in R&D circles on world scale with their technology driven innovations. However, in both clusters the R&D institutes did not manage to establish a successful cooperation with firms. On the whole, the weak sense of ownership of the clusters resulted in a limited participation and weak cooperation of entrepreneurs in the cluster. Moreover, the small scale of most firms and the lack of well-trained human resources hamper the uptake of innovations. So the adaptation of innovations by entrepreneurs is rather poor and private funds for R&D almost absent. Hence the activities of Polimat terminated with the end of EU financing in 2014.

Barriers for the development of the bioeconomy clusters in Osrednjeslovenska
The bioeconomy clusters in Osrednjeslovenska face a number of barriers. These include:

- a weak sense of ownership of the clusters;
- a lack of active participation of entrepreneurs in the cluster;
- a lack of an innovation culture among entrepreneurs;
- a lack of cooperation among firms and R&D institutes;
- absence of a long term political commitment towards the development of the bioeconomy clusters;
- a lack of public and private funding.

Regional structure

Table 4.21 Indicators describing the potential bioeconomy in Osrednjeslovenska in 2013 compared to (NUTS-0) Slovenia average

Criteria	Indicator	Osrednjeslovenska	(NUTS-0) Slovenia	Osrednjeslovenska (z-scores[1])
Land use	Forestry land [% of total land area]	25,9	18,6	1,0
	Agricultural & horticultural land [% of total land area]	24,4	23,5	0,1
Biomass availability	Agricultural biomass production [kg/capita]	1,12	2,38	-1,1
	Blue biomass production [kg/capita]	0,00	0,00	0,0
	Forestry biomass production [kg/capita]	0,93	1,40	-0,7
	Waste production [kg/capita]	0,04	0,08	-1,2
Innovation	SME birth rate [% of total firms in region]	17,6	18,8	-0,6
	R&D expenditure [index (EU=1)]	0,54	0,51	1,0
Employment structure	R&D employment [% of total employment in region]	0,5	0,5	1,0
	Employment in total bioeconomy sectors [% of total employment in region]	12,9	20,8	-1,0
	Employment in chemical sector [% of total employment in region]	2,4	3,4	-0,4
	Employment in energy sector [% of total employment in region]	0,6	0,9	-0,4
	Employment in paper & pulp sector [% of total employment in region]	1,3	2,1	-0,6
	Employment in textile sector [% of total employment in region]	0,4	1,2	-0,8
Cluster size	Firms in total bioeconomy sectors [% of total firms in region]	16,3	19,1	-1,0
	Firms in chemicals sector [% of total firms in region]	0,8	0,9	-0,4
	Firms in energy sector [% of total firms in region]	0,1	0,2	-0,9
	Firms in paper & pulp sector [% of total firms in region]	1,7	2,0	-0,4
	Firms in textile sector [% of total firms in region]	0,7	0,9	-0,6
Demographics	Population growth [% year in region]	0,9	0,3	1,4
	Population 15-65 years [% of total population in region]	68,5	68,4	0,1
	GDP (PPP) [index (EU=1)]	122,96	87,00	1,6
Quality of workforce	Secondary & Tertiary education [% of total population in region]	88,9	85,5	0,8

Source: BERST report 1.1 'Criteria and Indicators describing the regional bioeconomy, 2014; Eurostat, RIS, National statistics; 1) Z-scores compare the regional value with the national average (corrected for standard deviation).

Figure 4.29 Bioeconomy Readiness for Osrednjeslovenska in 2013 compared to (NUTS-0) Slovenia

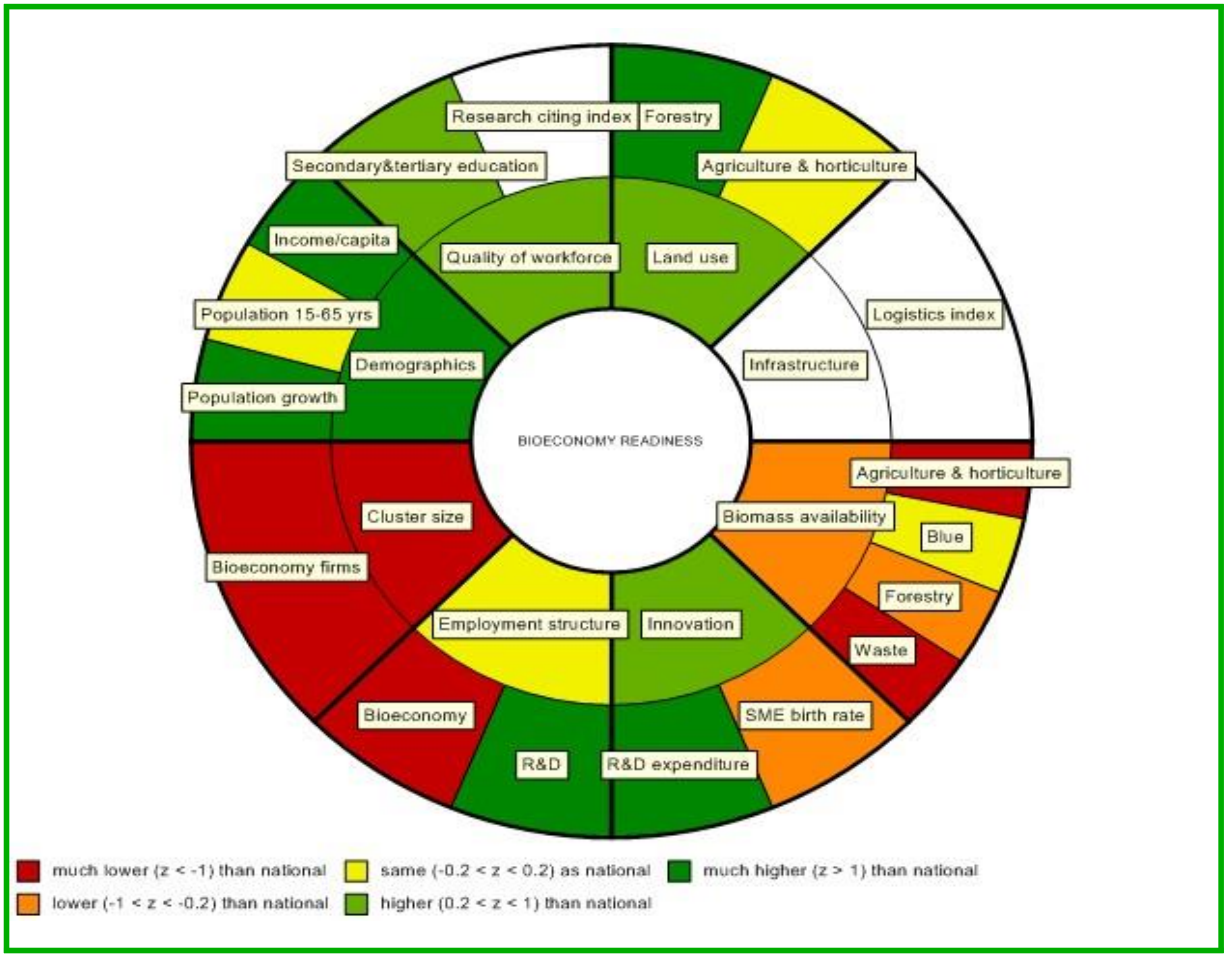


Figure 4.30 Employment structure (%) in Osrednjeslovenska in 2013 compared to (NUTS-0) Slovenia

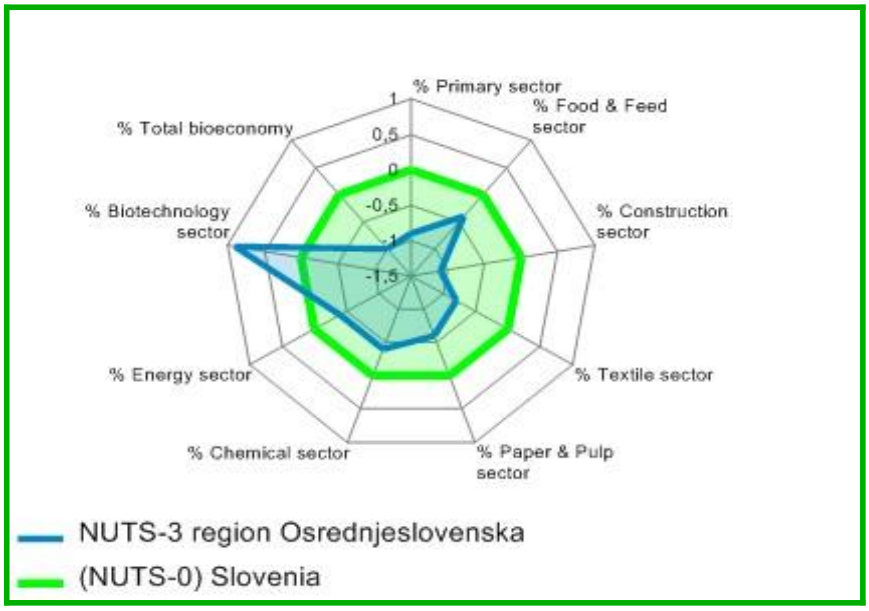
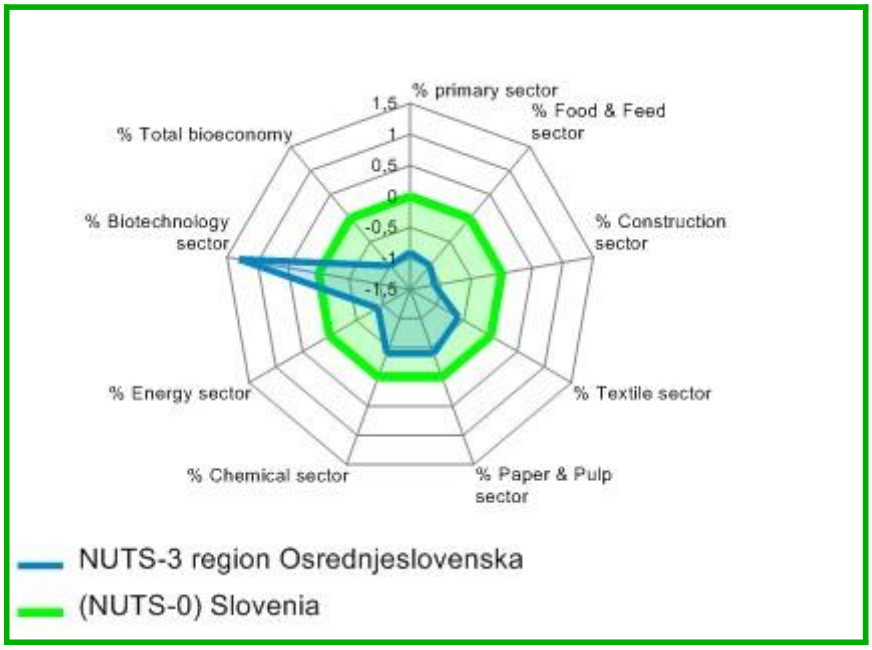


Figure 4.31 Firm structure (%) in Osrednjeslovenska in 2013 compared to (NUTS-0) Slovenia



Assessment of the qualitative indicators

Table 4.22 Scores for qualitative indicators of the bioeconomy clusters of Osrednjeslovenska (Polymat and wood cluster)

Criteria	*Indicator*	*Score*
Biomass availability	Presence of continuous supply of biomass with constant quality	moderate
Cluster management	Presence of a RIS3 with bioeconomy focus	weak
	Presence of a cluster organization which coordinates, manages and facilitates the biocluster	weak
	Commitment of regional policy makers and regional biocluster policy	weak
	Presence of an incubator	weak
Innovation	Bioeconomy cluster is integrated in or closely tied to science/technology park	weak
	Presence of an innovative milieu directed at the bioeconomy cluster	weak
Attractiveness of region	Attractiveness of region as place to settle for entrepreneurs and researchers	moderate
Availability of funding	Access to public funds	weak
	Access to private funds	weak

Recommendations for the further development of the bioeconomy cluster in Osrednjeslovenska

In BERST we especially focus on the potential of bioeconomy clusters, that originate in one of the four following sectors: chemicals, energy, paper & pulp and textiles. In the bioeconomy, these sectors transform biomass resources from the primary sector into new biobased competitive products by using knowledge from the R&D sector. Figures 4.30 and 4.31 show that the size of the paper & pulp and chemical sectors in Osrednjeslovenska is below but close to the national average while the textiles and energy sectors are relatively small. This makes the paper & pulp and chemical sectors good starting points for developing a bioeconomy cluster. It appears that efforts in this direction have already been taken in Osrednjeslovenska.

From the analysis of the qualitative indicators above a number of weaknesses appeared:

- absence of an innovative milieu directed at the bioeconomy cluster;
- lack of integration of the bioeconomy cluster in a science/technology park;

- absence of an incubator;
- lack of commitment of regional policy makers and regional biocluster policy;
- absence of a RIS3 with a bioeconomy focus;
- difficulties in getting access to public and private funds.

These weaknesses can be related to the perceived barriers for the development of the bioeconomy cluster in Osrednjeslovenska of lack of capacity of entrepreneurs to participate in the bioeconomy cluster, the low sense of ownership of the cluster and the absence of a long term political commitment towards the development of the bioeconomy clusters. Given these weaknesses it could be recommended to make efforts to strengthen the capacity of the local actors by learning them to cooperate, to use networks, and to assess their situation in the broader local and global context. With regard to the current state of PolyMat - that more or less disintegrated after the ending of the EU funds - it has to be decided whether efforts should be taken for a restart.

4.1.3.6 Developing a Community of Practice Network (WP5)

In Work Package 5, a network of BioRegions has been developed by the method of Community of Practice (CoP). A CoP brings together practitioners, policymakers, companies, cluster managers and researchers to jointly explore and share experiences on the development of regional bioeconomies in Europe. The objective is to increase the mutual understanding of how actors interact with each other in bioeconomy regions and to jointly build a toolkit. In addition, WP5 also spent efforts on alignment activities with platforms, networks, policies and projects at regional, national and at EU level in order to engage them in contributing and making use of the BERST findings and toolkit (see section 4.1.2).

Network development activities: organization of four COP meetings
In the course of the BERST project, four CoP meetings (including the BERST end-conference) have been organised (Table 4.23). The CoP meetings brought together the Consortium partners of BERST, the regional stakeholders of the hosting region, as well as external local, regional and national public and private stakeholders with a common interest to learn and share information about developing regional bioeconomy clusters. The meetings included a mix of presentations, key note speeches, brainstorm activities, matchmaking, as well as discussing sessions and field visits. The meetings were organized in the form of 'open invitation', half-day events in which the stages of the BERST project outputs from WP1-WP4 are presented, discussed, interacted and validated with practitioners and experts. Subsequently, the analyses in WP1-WP4 were fine-tuned.

Table 4.23 Overview of BERST CoP meetings

CoP meeting	Participants	Date	Participants
BERST CoP meeting-1	BERST consortium; Regional private stakeholders, EC and regional policy makers Location: Straubing, Germany	25-26 March 2014	50
BERST CoP meeting-2	BERST consortium; Regional private stakeholders, EC and regional policy makers Location: Ljubljana, Slovenia	29-30 Aug 2014	30
BERST CoP meeting-3	BERST consortium; Regional private stakeholders, EC and regional policy makers Location: Terneuzen, the Netherlands	21-23 April 2015	60
BERST End-Conference	BERST consortium, Advisory board, EC-RTD, EC-Growth, JRC-IPTS, regional stakeholders Location: Brussels, side event of Open days of Regions	14 Oct 2015	70+

4.1.4 Potential impacts and main dissemination activities and exploitation of results

Scientific results and impacts

The key purpose of the BERST project is to demonstrate how a region can valorise its bioeconomy potential. In this context, BERST has designed a format for a regional profile fact sheet and completed regional profiles for seven BERST regions. Both the design and completion of the regional profiles were conducted in an interactive and intensive cooperation of research partners and regional partners. The regional profiles include the following building blocks:

- a qualitative description of the bioeconomy cluster in the region, a discussion of which actors participate in the bioeconomy cluster, and an identification of barriers for the development of the bioeconomy cluster;
- a quantitative analysis of the regional bioeconomy with an identification of the current strength of each of the distinguished bioeconomy sectors in the region relative to the national average;
- factors enabling the bioeconomy clusters in Good Practice regions;
- recommendations for the further development of the bioeconomy cluster in the region.

The four building blocks of the regional profiles can be used as input for further steps in developing the bioeconomy cluster by entrepreneurs, R&D actors and policy makers in the specific region. Whether these steps will indeed be taken in the 7 BERST regions, is out of the scope of the BERST project. It depends on the willingness of the regional actors to build further upon the findings of the BERST project. Given the fact that one of the final steps of the BERST project consisted of the organization of regional workshops with entrepreneurs, R&D actors and policy makers in order to discuss the regional profiles, and given the involvement of regional partners in the design and completion of the regional profiles, it seems likely that such further steps towards developing the regional bioeconomy are foreseen in the 7 BERST regions.

The online tool (http://berst.databank.nl/) enables other EU regions as well to complete regional profiles. In this way, the BERST project may contribute to supporting and further developing regional bioeconomies in the EU.

Societal implications

BERST aimed to contribute to the competitiveness and cohesion (see Horizon 2020 objectives) policies of Europe by enhancing the sustainable utilisation of regional and local biobased resources, encouraging new investors and supporting decision makers in their work in developing bioeconomies. Given the current political emphasis on sustainable growth, as for example reflected the 'Biooeconomy Strategy for Europe'10, the future of bioeconomies or green economies seems promising as the BERST project showed. From the analysis in the Good Practice regions in BERST it appeared that these regions were successful in raising public funds that are related to hot items on the regional, national or EU political agenda, such as targets for renewable energy, encouraging the bioeconomy, chemical policies, regional innovation policies, etc. Although public funding is often project based, actors in the Good Practices were able to ensure continuous funding and to combine these public funds with private funds. If other regions willing to develop their bioeconomy do manage to implement this strategy of the Good Practices in their

[10] EC (2012), Innovating for Sustainable Growth: A Bioeconomy for Europe; Brussels, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2012) 60 final, February 13.

own region, this may encourage opportunities for firms and jobs in both well-developed regions and marginal regions in the EU.

In a broader sense, the societal impact of the BERST project could be depicted as the set of narratives of the development path of the bioeconomy clusters in the Good Practice regions, which provided a number of enabling factors for bioeconomy clusters. These narratives may serve as a practical guidance and source of inspiration for other regions that are willing to develop their bioeconomy potential. By means of the regional profile reports (see section 4.1.3) a start has already been made in using the narratives of the Good Practices in the BERST regions. By using the online format of the regional profile, other regions can also in a systematic way learn from the experiences of the Good Practices. In this way, the BERST project contributes to encouraging the European bioeconomy.

Alignment activities at regional, national and at EU level
Main aims of alignment activities have been to engage stakeholders in contributing and making use of the BERST findings and toolkit. Liaison activities included issues such as identifying alignment and agenda settings, participation in networks, exchange of knowledge and experiences, identifying complementary activities, exploring barriers and needs in bioeconomy development, and creating synergy effects across these similarly projects and platforms. Most liaison activities of the BERST team reflected a specific goal, for example closing the knowledge gap in retrieving information on current and future EU regional bioeconomy potentials, and how to describe and measure the development of the EU bioeconomy. Liaison activities were oriented to:

- European platforms, networks and projects;
- national initiatives to foster regional development of bioeconomy;
- single bioregions with high value for the BERST project.

During the BERST project, liaison activities have been performed with the following relevant platforms and projects:

a. *Bioeconomy Observatory (BISO) project, led by JRC-IPTS (March 2013-Feb 2016)*

BISO is an initiative from EC-JRC to gather and present in one place vital data about the development of the bioeconomy. Data will become a critical resource for policy-makers, business people and other stakeholders designing the policies and investments at national and regional level. The BERST team had meetings with the BISO project members with the purpose to explore synergies on data availability (about criteria and indicators, instruments and measures) between both projects. Two meeting were organised in the first BERST project year, in which both teams presented their project set-up and the progress of work activities. Projects similarities were identified at the level of collecting national indicator data (in case of BISO) and regional indicator data (in case of BERST) for the bioeconomy, and at the level of collecting national instruments and measures (in case of BISO) and regional instruments and measures (in case of BERST) that support the bioeconomy development. Due to management changes in the BISO project and the resulted delay in the progress of BISO activities, no further joint meetings have been organised in 2015 so far.

b. Working group on Natural Resources of the Committee of the Regions (CoR)

The CoR is the EU Assemblée of local and regional representatives, which consults in EU decision making processes. The CoR has a working group on Natural Resources, which is a network organization aiming at discussing and agenda-setting. The CoR produces 'position papers' in which their statements are presented to the EU and the members. The rapporteur of the Natural Resources working group is Mr Rogier van der Sande, who is supporting BERST and assists in connecting BERST with the CoR, by networking and participating in CoR events. BERST was presented to the CoR at the Firenze meeting in September 2014. The CoR is supportive with aligning BERST among members and with mentioning BERST in communication and working processes. For example, Van der Sande mentioned the BERST project in his speeches at the TOBE Stakeholder Conference in Torino (8 October 2014) and at the Open Days of the Regions in Brussels (13 October 2015).

c. ERRIN network

ERRIN network is a Brussels-based platform of Research and Innovation Organisations and Stakeholders in Regions. ERRIN aims to strengthen regional research and innovation capacities by exchanging information, sharing best practices, supporting European project development, policy shaping and profile rising by working together with a partnership approach. Through its 13 working groups, ERRIN facilitates contacts between regional offices and regions so that they can enhance their knowledge of European policy in research and innovation and develop strategic European projects to strengthen regional competitiveness. ERRIN has a working group on Bio Economy, with 30 participating EU regions. BERST has been connected with ERRIN and to this working group and engaged the ERRIN regions in the BERST development. ERRIN and BERST commonly organised the final BERST conference on 14 October 2015, as a side-event at the 'Open Days of the Regions and the Cities' in Brussels.

d. FP7 project SAT-BBE, led by LEI Wageningen UR (November 2012-March 2015)

The SAT-BBE (Systems Analysis Toolkit Framework of the Bioeconomy) project responds to the challenge of the resilience and emergence of the bioeconomy by providing a design of a system analyses tool framework to assess and address the short term and long term challenges, for an effective and sustainable EU strategy. The project has provided an interdisciplinary scientific basis to inform the bioeconomy policy development and decision-making by all stakeholders working within the EU to help improve the conditions for satisfying the bioeconomy potential today and in the coming decades. The outcome of SAT-BBE is a Systems Analysis Framework for the Bioeconomy, following a Driver-Impact-Response (DIR) concept. Working papers on which indicators and criteria can describe the bioeconomy and the role of instruments and measures that support the bioeconomy have been used in WP1 and WP2 of the BERST project.

e. Climate-Kic

Climate-Kic (Knowledge and Innovation Community) is an innovation partnership, working together to address the challenge of climate change by fostering innovation, education and entrepreneurship through private, public and academic collaborations. The partnerships integrate research, business and technology to transform innovative ideas into new products, services and jobs. The regional strategy of CKIC are regional innovation centers as well as thematic platforms, as there is the Bioeconomy platform, which aims to contribute to the transition of a bio-based economy to reduce our carbon footprint. BERST has been in touch with Climate KIC in order to connect with Climate KIC regions to be part of the European CoP network, as well as to communicate findings.

f. Biobased Industries Consortium (BBI)

Biobased Industries Consortium (BBI) is a Brussels-based non-profit international business association that was established in 2012 to represent the Biobased Industries, including a mix of sectors that currently covers agriculture, agro-food, technology providers, forestry, pulp and paper, chemicals and energy. With close to 200 members including large companies, SMEs, SME Clusters, RTOs, universities, technology platforms and associations spread across Europe, BBI brings together an authoritative pool of cross sector and multi-disciplinary expertise in the field of bio-based industries. Industrial members have all committed to invest in collaborative research, development and demonstration of bio-based technologies within the BBI.

Additional liaison activities of the BERST project expand to:

- national initiatives to foster the regional development of bioeconomy, as for instance in the Netherlands all regional bioeconomy initiatives are arranged as periodically meetings, facilitated by the Ministry of Economic Affairs. Participating in this kind of nationally organised meetings will enable new regions to get acknowledge of BERST, to contribute and to participate in the European Bioregion Network. Other BERST partners have also contacted the national public officer on bioeconomy in their country to enable new bioregions to engage in BERST;
- due to the increased visibility of BERST, the team has been contacted by single regions that want to be involved in BERST Community of Practice sessions. In order to facilitate the communication,

regions could contact the BERST team by a contact box on the website. Also the BERST team has fostered the online dialogue on bioeconomy topics, e.g. by organising a series of webinars;

- the BERST team has started collaboration with the IAR North of France region, and has presented them as a best practice at the final event in Brussels. IAR is willing to cooperate with the BERST consortium and network in follow up projects in H2020 trajectories.

4.1.5 Public website and relevant contact details

The *BERST consortium* comprised eight partners and was coordinated by LEI-Wageningen UR.

	Short name	Full name	Member State
1	LEI Wageningen UR	Agricultural Economics Research Institute	Netherlands
	Alterra Wageningen UR	Environmental Research Institute	Netherlands
	FBR Wageningen UR	Food and Biobased Research Institute	Netherlands
2	CE	Cambridge Econometrics	UK
3	Imperial	Imperial College of Science, technology and medicine	UK
4	VITO	Flemish Institute or Technological Research	Belgium
5	CERTH	Centre for Research & Technology Hellas	Greece
6	PTA-RDF	Region of Western Macedonia	Greece
7	UL	University of Ljubljana	Slovenia
8	JAMK	JAMK University of Applied Sciences	Finland
8	Madrid Biocluster	Asociación Madrid Plataforma de la Biotecnología	Spain
9	FPCM	Fundación Parque Científico de Madrid	Spain
10	FNR	Fachagentur Nachwachsende Rohstoffe e. V.	Germany
11	Keski-Suomen liitto	Keski-Suomen liitto (Regional Council of Central Finland)	Finland
12	Gemeente Westland	Westland Zuid-Holland	Netherlands
13	BCG	BioCampus Straubing GmbH	Germany
14	Biobased Delta	Economische impuls Zeeland NV	Netherlands

BERST Logo

BERST Website

The central channel for dissemination purposes in the BERST project is the BERST website, which was launched early 2014 and has been maintained by LEI Wageningen UR. The website has continuously been updated along the whole project duration. The main goals of the BERST website are twofold:

- to provide information on the project's partners, activities, progress and outcomes; (public area):
  - *home* page; with project acronym, news and contact information about project coordination team, including a link to the BERST flyer, the BERST Newsletter and a series

of BERST posters indicating objectives, findings and recommendations of the BERST project, and a summary of the bioeconomy profiles of BERST regions;
    - *project* page, with objectives, approach, expected achievements, *partner team* page, with information about the consortium teams, such as their expertise, the contact persons, and links to their institutional websites;
    - *BioRegional toolkit* page, containing the tools in the toolkit under development, such as the catalogue of Criteria and Indicators, the Catalogue of Measures and Instruments, the Catalogue of Case Studies and Good Practices, guidelines to generate Regional Profiles, and a CoP network;
    - *news and events* page, containing BERST relevant events (in past and upcoming) as well as all project meetings;
    - *papers* page, for making accessible any related public document, such as public deliverables, community of practice reports, publications and dissemination material;
- to offer to project partners access to all documentation and deliverables produced in the course of the project (partner's area). This page is accessible only to consortium members through user authentication.

Moreover, project partners have linked the BERST project information to their own institutional websites e.g. by FNR, Straubing, JAMK, Wageningen UR, CERTH, Central Finland, Biobased Delta, BioBase Westland, Madrid biocluster, Western Macedonia, Ljubljana University and VITO. In order to disseminate the BERST toolkit to a wider audience, the BERST project has been interlined with ERRIN and BISO websites. Annex 1 contains screenshots of the BERST website, both for the public and the partner's area.

Figure 4.32 Public area of BERST website (home page)

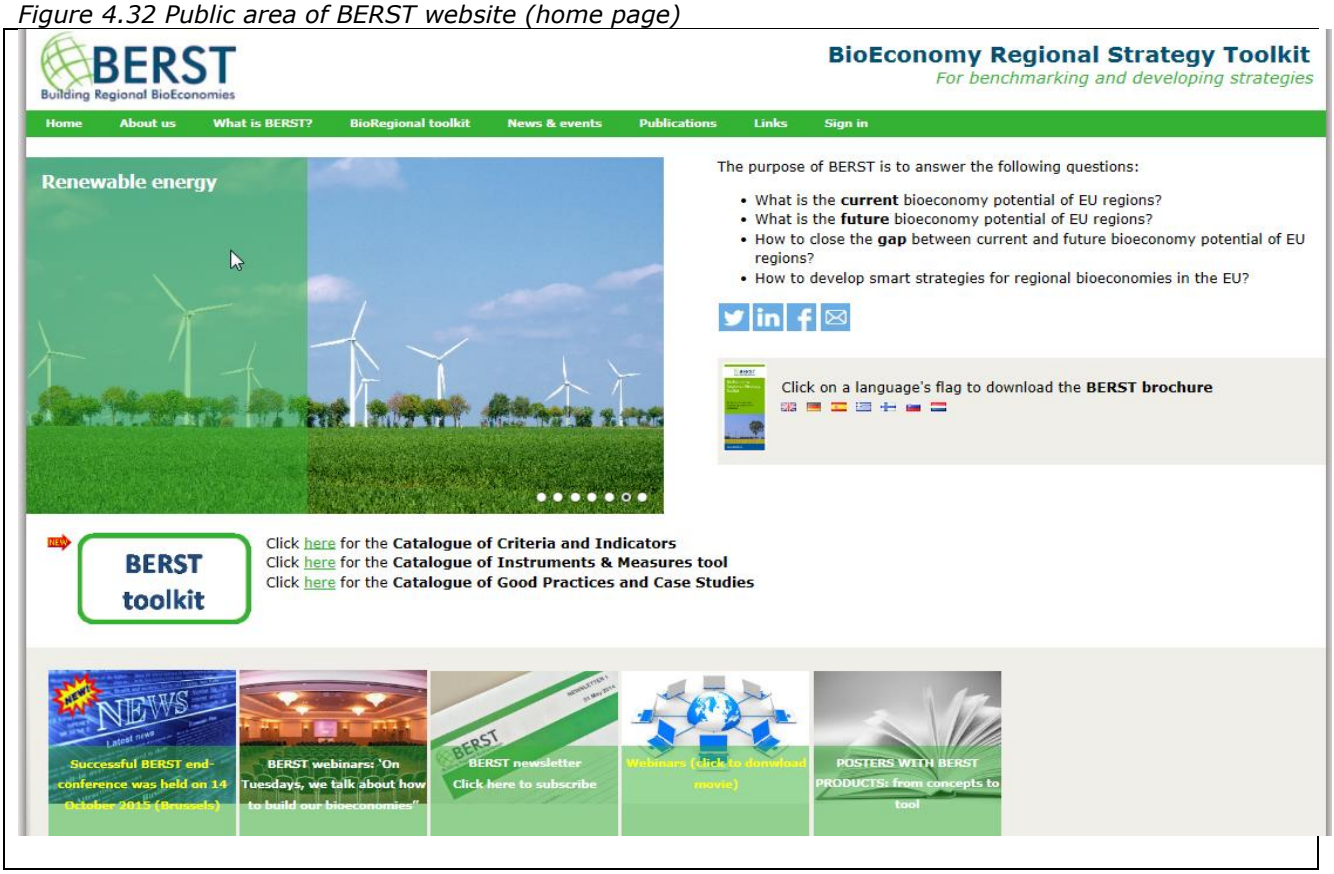
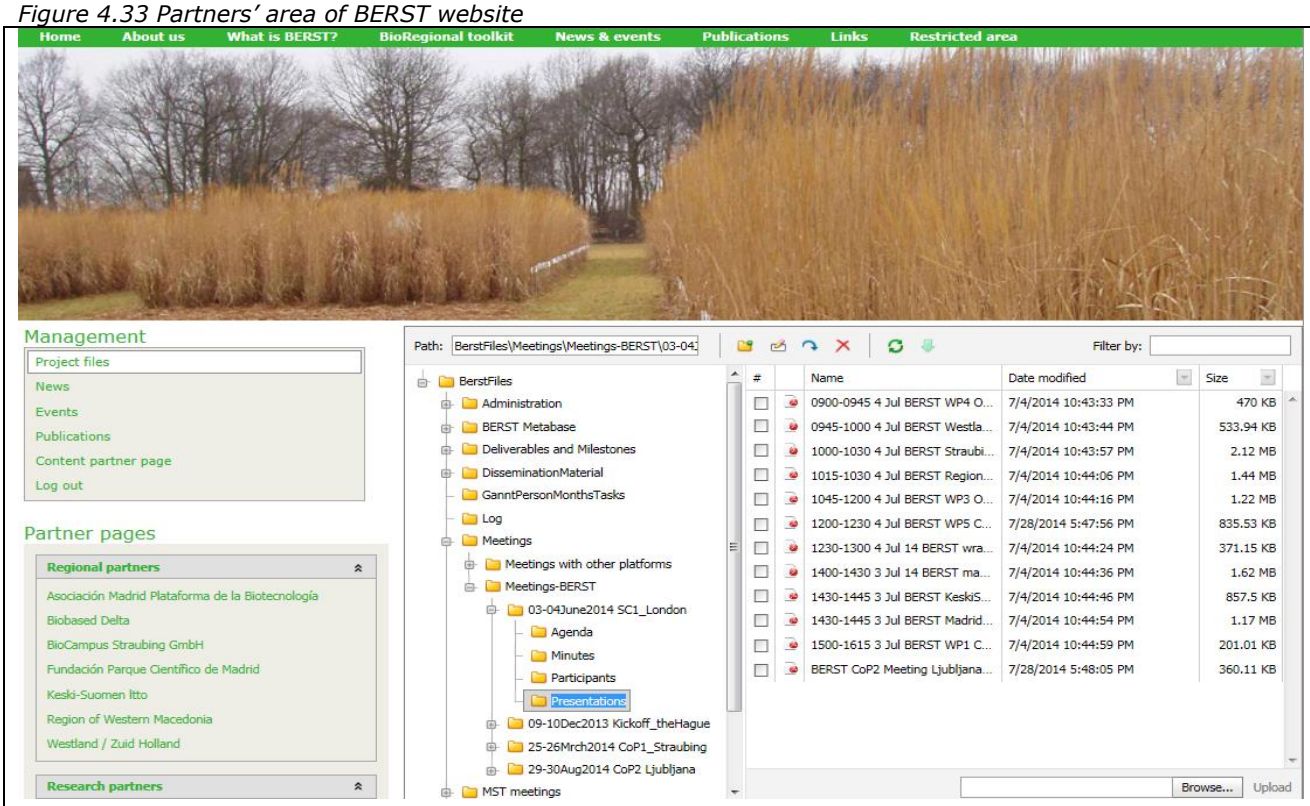
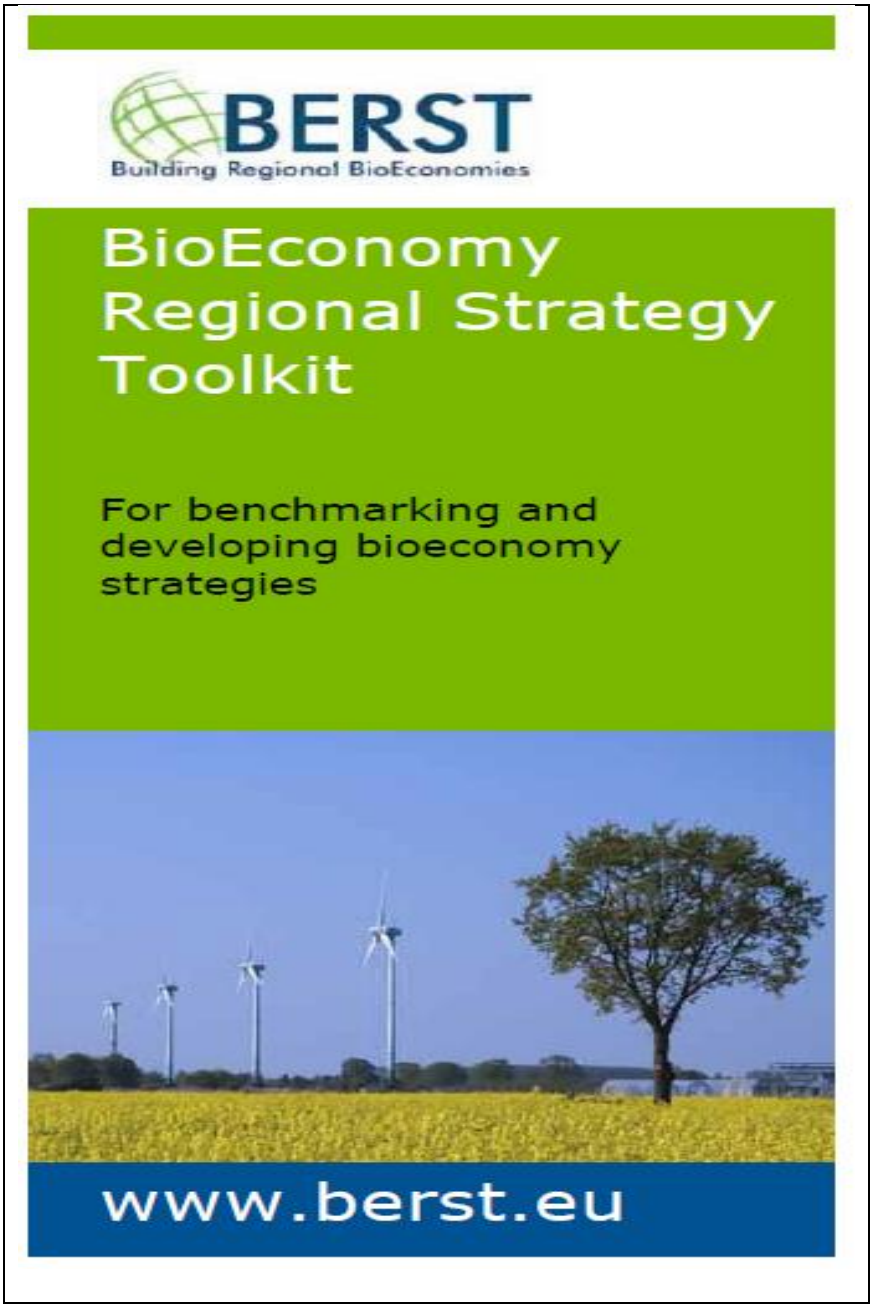


Figure 4.33 Partners' area of BERST website



BERST Flyer


BERST
Building Regional BioEconomies
BioEconomy
Regional Strategy
Toolkit
For benchmarking and
developing bioeconomy
strategies
www.berst.eu

BERST Newsletters

BERST
Building Regional BioEconomies

NEWSLETTER 1

31 May 2014

Contents

Welcome to BERST

We are pleased to present to you the first issue of the e-newsletter of **BERST**, the acronym of **BioEconomy Regional Strategy Toolkit**, which is a Coordination and Supply Action project supported by EU funding under the FP7 framework. Private and public stakeholders from EU regions and academics from EU universities and research institutes work together with the ambition to deploy the bioeconomy potential in European regions.

The BERST project duration is from December 2013 to December 2015. The BERST consortium consists of 7 regional partners from Finland, Spain, Germany, the Netherlands and Greece; and 8 research partners from United Kingdom, Greece, Germany, Belgium, Slovene and the Netherlands.

The e-newsletter addresses researchers, policymakers and other stakeholders from within and outside the project who are interested in the latest research activities with regard to the regional bioeconomy. The newsletter will keep you updated two times a year. You can also visit our website www.berst.eu.

BERST team at CoP meeting in Straubing, March 2014.

1

Towards a bioeconomy cluster in Delft en Westland

Current performance and future potential of regional bioeconomy

1. Introduction

What is a bioeconomy?

In the bioeconomy, biomass resources are transformed into competitive bioeconomy products. The total bioeconomy includes (EC, 2012[1]):

- the *traditional (100%) biobased* sectors such as agriculture, horticulture, forestry, fisheries, food & feed, and pulp & paper; and
- the *new biobased sectors* such as biotextile, biochemistry, bioenergy and biotechnology.

As EU and national statistics do not distinguish biobased and fossil-based activities within the textile, chemistry, energy and technology sectors, BERST uses data for the whole textile, chemistry, energy and technology sectors for indicating the size of the total *potential* bioeconomy.

What is a bioeconomy cluster?

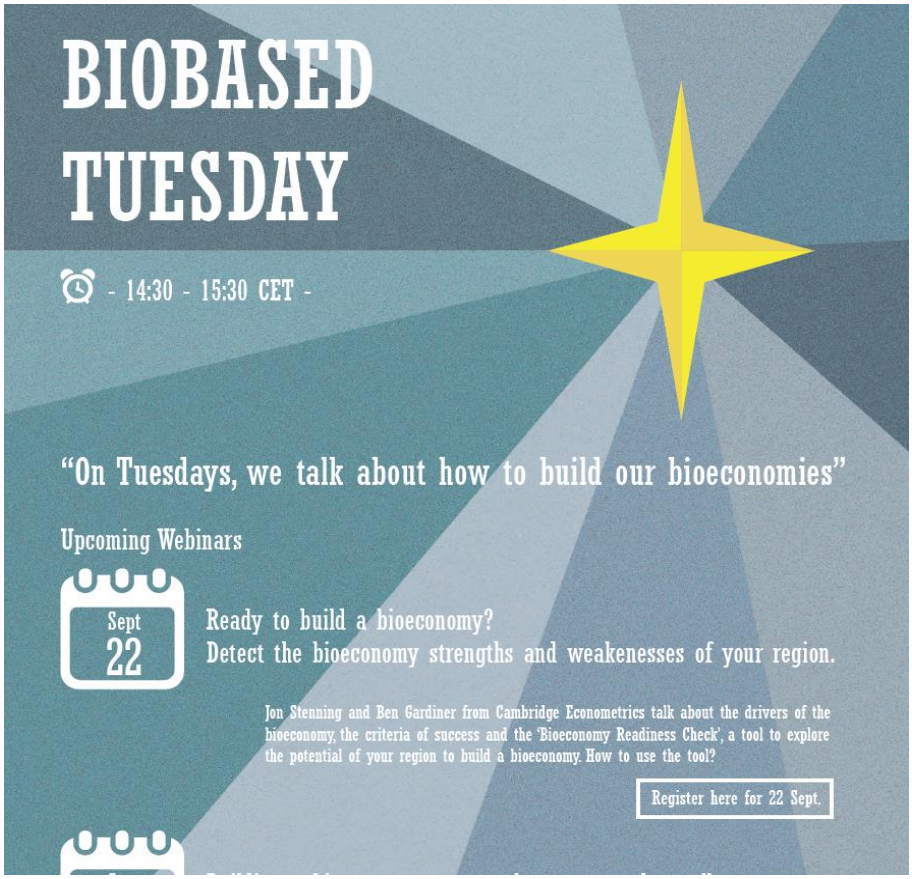
A bioeconomy cluster is perceived in BERST as a geographically proximate group of interconnected firms and associated institutions aiming to develop the bioeconomy. In this cluster, firms are tied to other firms through formal linkages (i.e. the input-output linkages) and through untraded interdependencies (norms, trust and a strong local network of private and public institutions). Given the broad coverage of sectors within the bioeconomy, bioeconomy clusters might be rather heterogeneous in their specific focus.

How to develop the bioeconomy cluster in Delft en Westland?

The bioeconomy cluster usually starts in one economic sector and in the course of time more economic sectors become involved due to cross-overs among sectors. The development of the cluster can be seen as a collective

BERST PowerPoints

BERST Webinars and Final Conference Promotion



4.2 Use and dissemination of foreground

A plan for use and dissemination of foreground (including socio-economic impact and target groups for the results of the research) has been established. It contains the use and dissemination of foreground and is consistent with the report on societal implications on the use and dissemination of foreground (section 4.3). The dissemination report consists of:

Section A
This section describes the dissemination measures, including any scientific publications relating to foreground. **Its content is available on the public domain** thus demonstrating the added-value and positive impact of the project on the European Union.

Section B
This section specifies the exploitable foreground and provide the plans for exploitation. All these data are public or confidential; the report clearly marks non-publishable (confidential) parts that have been treated as such by the Commission. Information under Section B that has not been marked as confidential is **available in the public domain** thus demonstrating the added-value and positive impact of the project on the European Union.

Sections A and B Dissemination / Promotional Information

Section A1. Scientific publications

No.	Partner	Date of publication/ submission	Title and authors	Name of the Journal	Non refereed literature	Peer-reviewed literature
1	VITO	26.06.2014	The BERST project; Ruben Guisson and Myrna Van Leeuwen	22nd EU BC&E Online Proceedings 2014	x	
2	JAMK	8.12.2014	Liiketoimintaa biotaloudesta – Biotalousstrategia alueen kehittämisessä; Vertainen, Laura (JAMK)and Koponen, Hannu (RCCF)	Maaseudun tiedetreffien satoa – Artikkelikokoelma ja kokemuksia Maaseudun tiedetreffit-hankkeesta (2013-2014). HAMK publications. https://publications.theseus.fi/bitstream/handle/10024/83860/HAMK_Maaseudun_tiedetreffit_2014_ekirja.pdf?sequence=1	x	
3	All partners	In progress	BERST special issue. proposal has been accepted by the Biofuels, Bioproducts & Biorefining (Biofpr) journal	Biofuels, Bioproducts & Biorefining (Biofpr) journal. http://www.biofpr.com/view/0/journal.html		x

Section A2. Dissemination activities

No	Partner	Date	Title or Issue	Type					Dissemination level			
				Flyer/Brochure	Conference/ Workshop			Other	Worldwide	Europe wide	National	Local
					oral	abstract	poster					
1	CE	08.05.2014	Meeting with JRC to discuss collaboration with S3 platform					X				
2	DLO-Alterra	19.09.2014	Berst presentation Committee of the Regions - Meeting Firenze How to build Regional Bioeconomies and new agricultural entrepreneurship?		X					X		
3	DLO-Alterra	08/09.10. 2014	TOBE participation – Torino. 3rd Biobased Stakeholder Meeting		X					X		
5	DLO-Alterra	26.02.2014	Berst meeting - Ministry of Economic Affairs					X			X	
6	DLO-Alterra	various	Berst engagement by mail and indirect by delegations - Region Lubelski Poland					X				X
7	DLO-Alterra	28.10.2014	Berst Presentation - Finnish Delegation					X				X
8	DLO-Alterra	15.05.2014	Biobased Innovation Cluster Oost Nederland					X				X
9	DLO-Alterra	02.10.2014	Berst presentation - Belarus Delegation in Wageningen					X			X	
9	DLO-Alterra	23.06.2015	Berst presentation - National event 'Netwerkbijeenkomst Biobased Economy', Amsterdam (Netherlands)		X						X	
10	DLO-Alterra	Sep-Oct.2015	Webinars 'on Tuesdays we talk on bioeconomy'; various themes					X				
11	DLO-LEI	08/09.10.2014	TOBE participation – Torino. 3rd Biobased Stakeholder Meeting		X					X		
12	DLO-LEI	28.08.2014	Poster presentation on BERST objectives and progress (Building regional strategies - conceptual framework) to the 14th EAAE conference Agri-Food and Rural Innovations for Healthier Societies, in Ljubljana, 26th -29th August 2014.		X		X			X		
13	DLO-LEI	12.11.2014	BERST presentation on building blocks of the BERST toolkit to be developed. Symposium on "Cross-Sectoral and Cross-Regional Cooperation to develop a European Bioeconomy", 12 Nov 2014, Brussels. Organized by the Representation of the State of Saxony-Anhalt to the European Union, together with the Ministry of Science and Economic Affairs of the State of		X					X		

			Saxony-Anhalt.									
14	DLO-LEI	26.01.2015	BERST presentation at Ministry of Economic Affairs		x						x	
15	DLO-LEI/ DLO-Alterra/ CERTH/JAMK	19/20.03.2015	ERRIN event 'Boosting economic growth and facilitating investments through the bioeconomy: how to build effective regional strategies?', Brussels (Belgium)					x		x		
16	DLO-LEI	02/04.09.2015	Poster presentations on development patterns of bioeconomy 14th EAAE conference "Agri-Food and Rural Innovations for Healthier Societies", Jyväskyla (Finland)		x		x			x		
17	DLO-LEI	08.10.2015	4th SCAR foresight stakeholder conference, Brussels (Belgium)					x		x		
18	DLO-LEI	08/09.11.2015	Bioeconomy Investment Summit, Brussels (Belgium)					x		x		
19	FNR	28.11.2013	Launch of new project: BERST – BioEconomy Regional Strategy Toolkit					X			X	
20	FNR	31.03.2014	First Community of Practice (CoP) meeting took place in Straubing, Germany					X			X	
21	FNR	10.06.2014	BERST: Flyer and 1st newsletter published					X			X	
22	FNR	15.07.2014	First Steering Committee Meeting in London					X			X	
23	FNR	20.08.2014	2nd Community of Practice (CoP) meeting to take place in Ljubljana, SLO					X			X	
24	FNR	15.09.2014	BERST - Second Community of Practice meeting successfully carried out					X			X	
25	JAMK	24.09. 2014	Hämeenlinna, Finland, in Finnish project "Maaseudun tiedetreffit (Meetings for the Rural Researches and the Entrepreneurs)". The Topic was Bioeconomy and the renewable energy solutions. The topic of our presentation was "Business from BioEconomy, case Central Finland"		x	x					x	
26	JAMK	02/04.09.2015	Paper presentations on development patterns of bioeconomy 14th EAAE conference "Agri-Food and Rural Innovations for Healthier Societies", Jyväskyla (Finland)		x					x		
27	JAMK	08/09.11.2015	National seminar 'Biotalous 2015 seminaari', in Helsinki (Finland)		x						x	
28	Keski	01.09.2014	Bioeconomy and regions/Thomas Rieke, Saxony-Anhalt region					X		X		
29	Keski	01.09.2014	BERST and possibilities for ERRIN cooperation/Sanna Alaranta WFEO					X		X		
30	Keski	24.03.2015	Bioeconomy and central Finland, lecture for Jyväskylä university students		x							x
31	Keski	21.04.2015	BERST project presentation to WFEO (West Finland EU office)					x			x	

32	Keski	26/29.05.2015	Building new biomass supply chains for the bio-based economy, Sardinia, Italy					x		x		
33	LU	03.07.2014	Translation of the BERST brochure No 1 to Slovene	x							x	
34	FPCM	30.11.2014	Madrid Region Bioeconomy Potential		x							x
35	FPCM	30.06.2014	Spanish Dissemination Brochure Translation	x					x			
36	FPCM	30.04.2014	Bioeconomy talks to Innovation Master Alumni		x							x
37	FPCM	30.06.2014	Biotechnology and Bioeconomy to Innovation Master Alumni				x					x
38	FPCM	30.07.2014	Bioeconomy and Biotechnology at Madrid Science Park. ESTSI Agronomos.		x							
39	FPCM	30.09.2014	Biorefineries and Bioeconomy. Sustainable Chemistry Guide Workshops attendance and collaborations.					x				x
40	FPCM	30.11.2014	Berst project presentation to members of European Miracles Project		x			x		x		
41	FPCM	16.03.2015	Berst presentation to Philadelphia University group		x			x				x
42	FPCM	23.09.2015	Berst presentation to Chilean tech transfer group		x			x				x
43	FPCM	30.01.2015; 03.08.2015	Berst bioeconomy considerations diffusions, among the bio-refinery state of the art group coordinated by sustainable chemistry platform Spain.		x			x				
44	FPCM	23.09.2015	Berst presentation to Spanish bioeconomy strategy coordinator Manuel Lainez		x			x			x	
45	FPCM	21.09.2015	Presentation of BERST to the Madrid Regional government- Dept of Economy and Innovation		x			x				x
46	FPCM	22.05.2015; 26.11.2015	Berst diffusion and networking during two local trans-sectoral		x			x				x
47	FPCM	various	Contacts with science park national networks and green entrepreneurs network (agriculture and environmental ministry) trying to promote BERST tools for bioeconomy regional strategies development with the implications of incubators, entrepreneurs and science and technology parks.		x			x			x	
48	BCG	20.10.2014	"Straubing – The Site for Bioeconomy in Bavaria" at the "Cooperation Forum Biopolymers"		x							x
49	BCG	30.03.2014	Flyer announcement of CoP2 in Straubing (DE), 25-26 March 2014	x								
50	BCG	27.03.2014	Press release on CoP2 findings in local newspaper, 27 March 2014					x				
51	BCG	25/26.03.2015	*Presentation at Bratislava-based Conference "Advanced Biofuels, Biorefinery and Bio-Economy: A Challenge for Central and East European Countries"*		x					x		
52	BCG	21.09.2015	Regional workshop on BERST regional profiles and toolkits		x							x

53	BCG	15.12.2015	Presentation of project results and online tools in the board of advisors of the partner		x							x
54	MB	23.04.2014	Presentation of BERST to members of the Madrid Biocluster	x	x							x
55	MB	20.10.2014	Presentation of BERST to the Energy Renewables Cluster	x	x							x
56	MB	17.11.2014	Presentation of BERST to the IDEA- Instituto de diversificacion y ahorro de la energia	X	X						X	
57	MB	01.06.2014	Presentation of BERST to "factor verde" from the Spanish Association of companies orientated to the Energy Services	x				X			x	
58	MB	24.03.2014	Presentation BERST to Biovald, main productor of pellest in the Madrid region	x				X				x
59	MB	12.03.2015	Presentation to the team in charge of elaboration of the RIS3 Strategy of the Region of Madrid of the Berst project		x							x
60	MB	16.07.2015	Presentation to Genetrix , a leading Spanish company in the biotech industry, of the Berst project		x							x
61	MB	16.07.2015	Presentation to Proalt, a highly successful Spanish company in R&D, of the Berst project.									
62	MB	17.07.2015	Presentation to Infiqus, a spin-off from the University UAM specilaied in biotech for the agroindustry of the Berst project .		x							x
63	MB	21.09.2015	Presentation of BERST to the Madrid Regional government- Dept of Economy and Innovation	x	x							x
64	MB	23.10.2015	Networking with potential bioeconomy stakeholders in the presentation of the Work Programme 2016-2017, of the Social Challenge Bioeconomy	X							X	
65	MB	28.10.2015	Networking with bioeconomy stakeholders in the program "innovation meet corporate venturing"	x	x						x	
66	VITO	26.06.2014	Bioecoomy regional strategy toolkit: the BERST project		x				x			
67	VITO	05.11.2014	BERST, bouwt aan je regionale bio-economie					x			x	
68	VITO	03.06.2014	BERST Instruments & Measures tool – BISO-regions		x					x		
69	VITO	24.06.2014	BERST-project BioEconomy Regional Strategy Toolkit (FP7-KBBE)		x						x	
70	VITO	26.11.2014	BERST: Building regional BioEconomies		x							x
71	VITO	16.09.2014	BERST introduction to ERRIN Workshop		x					x		
72	VITO	11.12.2015	Presentation WP2 extended @ ERRIN Working Group (Dec 2014)		x							
73	VITO	17.02.2015	Presentation BERST & WP2 @ SCAR meeting strategic working group on "sustainable bioresources for a growing bioeconomy" (Feb 2015)		x					x		

74	VITO	06.10.2015	WP2 webinar presentation		x			x		X		
75	VITO	14.10.2015	End-Conference WP2 poster presentation				x			x		
76	VITO	29.10.2015	Presentation BERST & WP2 @ Biomass Sounding Board University Hasselt (Oct 2015)		x							x
77	Gem. Westland	October 2014	Newsletter to our network with information about the BERST-project					x			x	x
78	All partners	14.10.2015	Poster presentations on BERST findings, regional profiles at Final BERST Conference, in Scotland House, Brussels (Belgium)									
79	All partners	12/15.10.2015	Open Days of the regions 2015, Brussels (Belgium)					x		x		
80	DLO/CE/IC/JJ AMK/CERTH/ Western Macedonia	26.05.2015	Conference 'Bioeconomy & Industrial symbiosis: concepts for promoting sustainable growth and development'; parallel activity to the Global Conference on Global Warming 2015 (GCGW-2015), Athens (Greece)		X					X		

Section B1. List of applications

Type of exploitable foreground	Description of Exploitable Foreground	Confidential/ Embargo	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable for commercial use or any other use/patents	Owner and Other Beneficiary(s) involved
Exploitation of results through EU policies	Exploitation of results through EU policies Online tool with cri teria and indicators that can recognize the potential of the regional bioeconomy.	No	1) Dynamic regional bioeconomy factsheets, with quick scans of current status of the regional bioeconomy and its potential; benchmarking analysis; spiders. 2) reports with case studies and good practices. See www.berst.eu and http://berst.databank.nl and http://berst. databank.nl/dashboard (under construction by own DLO LEI expenses)	bioeconomy sectors (primary, energy, chem, paper, textile, biotech, food&feed)	not applicable; open access from end-date of BERST project (30 Nov 2015)	DLO Wageningen UR has developed tool (ow ner); CE, Imperial, VITO, CERTH, UL, JAMK,MB,FPCM, PTA, Keski,Gemeente Westland,BCG and Impuls contributed.

Exploitation of results through EU policies	Online tool with instruments and measures that can support the potential of the regional bioeconomy	No	)nline tool with instruments and measures that can enable/support the development of the regional bioeconomy. At regional, national, EU levels; for different topics and sectors; incl I&M used in good practices.	bioeconomy sectors (primary, energy, chem, paper, textile, biotech, food&feed)	not applicable; open access from end-date of BERST project (30 Nov 2015)	VITO has developed the tool(owner); CE, Imperial, CERTH,UL,FNR,JAMK,MB ,FPCM,PTA, Keski,Gemeente Westland,BCG and Impuls contributed.
General advancement of knowledge	Online Catalogue with Case Study bioregions and Good Practice bioclusters.	No	Reports (pdf) with analysis of the bioeconomy clusters in BERST case study regions; 2) Reports (pdf) with good practice bioclusters. Both reports are on BERST website (www.berst.eu) and under http://berst.databank.nl/ http://berst.databank.nl/dashboard	bioeconomy sectors (primary, energy, chem, paper, textile, biotech, food&feed)	not applicable; open access from end-date of BERST project (30 Nov 2015)	Imperial College and DLO Wageningen have developed the conceptual framework used in the reports (joint ownership). CE, VITO, CERTH,UL,FNR,JAMK,MB ,FPCM,PTA, Keski,Gemeente Westland,BCG and Impuls contributed.
General advancement of knowledge	Online tool to create (dynamic) regional bioeconomy profiles for NUTS regions in Europe. Factsheets contain quantitative and qualitative information that support the development of regional bioeconomy strategies.	No	1) Factsheets with bioeconomy profiles for 7 BERST regions (inc. quick scan, swot, recommendations for developing regional bioeconomy strategies). 2) Option to create dynamic factsheets with bioeconomy profile for a selected region (as long as data have been collected under BERST project).See www.berst.eu and http://berst.databank.nl and http://berst.databank.nl/dashboard (under construction by own DLO LEI expenses)	bioeconomy sectors (primary, energy, chem, paper, textile, biotech, food&feed)	not applicable; open access from end-date of BERST project (30 Nov 2015)	DLO Wageningen UR and JAMK have developed the conceptual framework of the profile factsheets (joint ownership); CE, Imperial, VITO, CERTH,UL,FNR,MB,FPCM ,PTA, Keski,Gemeente Westland,BCG and Impuls contributed

General advancement of knowledge	A network of bioregions has been developed by the concept of a Community of Practice (CoP).	No	Community of Practice as network of bioregions. The CoP brings together practitioners, policymakers, companies, cluster managers and researchers to jointly explore and share experiences on the development of regional bioeconomies in Europe	bioeconomy sectors (primary, energy, chem, paper, textile, biotech, food&feed)	not applicable; open access from end-date of BERST project (30 Nov 2015)	DLO Alterra has established the BERST Community of Practice concept (owner). CE, Imperial, VITO, CERTH,UL,FNR,JAMK,MB ,FPCM,PTA, Keski,Gemeente Westland,BCG and Impuls contributed.

4.3 Report on societal implications

Replies to the following questions will assist the Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

A General Information *(completed automatically when **Grant Agreement number** is entered.*

Grant Agreement Number:	613671
Title of Project:	BioEconomy Strategy Regional Toolkit
Name and Title of Coordinator:	Myrna van Leeuwen (Msc)

B Ethics

1. Did your project undergo an Ethics Review (and/or Screening)? • If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 *'Work Progress and Achievements'*	***no***
2. Please indicate whether your project involved any of the following issues (tick box) :	
RESEARCH ON HUMANS	
• Did the project involve children?	no
• Did the project involve patients?	no
• Did the project involve persons not able to give consent?	no
• Did the project involve adult healthy volunteers?	no
• Did the project involve Human genetic material?	no
• Did the project involve Human biological samples?	no
• Did the project involve Human data collection?	no
RESEARCH ON HUMAN EMBRYO/FOETUS	
• Did the project involve Human Embryos?	no
• Did the project involve Human Foetal Tissue / Cells?	no
• Did the project involve Human Embryonic Stem Cells (hESCs)?	no
• Did the project on human Embryonic Stem Cells involve cells in culture?	no
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	no
PRIVACY	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	no
• Did the project involve tracking the location or observation of people?	no
RESEARCH ON ANIMALS	
• Did the project involve research on animals?	no
• Were those animals transgenic small laboratory animals?	no
• Were those animals transgenic farm animals?	no

• Were those animals cloned farm animals?	no
• Were those animals non-human primates?	no
RESEARCH INVOLVING DEVELOPING COUNTRIES	
• Did the project involve the use of local resources (genetic, animal, plant etc)?	no
• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?	no
DUAL USE	
• Research having direct military use	No
• Research having the potential for terrorist abuse	no

C Workforce Statistics

3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).

Type of Position	Number of Women	Number of Men
Scientific Coordinator	1	0
Work package leaders	3	3
Experienced researchers (i.e. PhD holders)	7	8
PhD Students	-	-
Other		

4. How many additional researchers (in companies and universities) were recruited specifically for this project?	1
Of which, indicate the number of men:	1

D Gender Aspects

5. Did you carry out specific Gender Equality Actions under the project?

☐ Yes
☒ No

6. Which of the following actions did you carry out and how effective were they?

	Not at all effective				Very effective
Design and implement an equal opportunity policy	☒	☐	☐	☐	☐
Set targets to achieve a gender balance in the workforce	☒	☐	☐	☐	☐
Organise conferences and workshops on gender	☒	☐	☐	☐	☐
Actions to improve work-life balance	☒	☐	☐	☐	☐

☐ Other:

7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?

☐ Yes- please specify

☒ No

E Synergies with Science Education

8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?

- ☐ Yes- please specify
- ☒ No

9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?

- ☐ Yes- please specify
- ☒ No

F Interdisciplinarity

10. Which disciplines (see list below) are involved in your project?

- ☐ Main discipline[21]: agriculture (bioeconomy)
- ☐ Associated discipline[21]:energy
- ☐ Associated discipline[21]: enterprise

G Engaging with Civil society and policy makers

11a Did your project engage with societal actors beyond the research community? *(if 'No', go to Question 14)*	☒ ☐	Yes No

11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?

- ☐ No
- ☐ Yes- in determining what research should be performed
- ☐ Yes - in implementing the research
- ☒ Yes, in communicating /disseminating / using the results of the project

[21] Insert number from list below (Frascati Manual).

11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?	☐ ☒	Yes No

12. Did you engage with government / public bodies or policy makers (including international organisations)

- ☐ No
- ☐ Yes- in framing the research agenda
- ☐ Yes - in implementing the research agenda
- ☒ Yes, in communicating /disseminating / using the results of the project

13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?

- ☒ Yes – as a **primary** objective (please indicate areas below- multiple answers possible)
- ☐ Yes – as a **secondary** objective (please indicate areas below - multiple answer possible)
- ☐ No

13b If Yes, in which fields?					
Agriculture Competition		Energy Enterprise Fisheries and Maritime Affairs		Regional Policy Research and Innovation	

13c If Yes, at which level?

- ☒ Local / regional levels
- ☒ National level
- ☒ European level
- ☐ International level

H Use and dissemination

14. How many Articles were published/accepted for publication in peer-reviewed journals?	2
To how many of these is open access[22] provided?	2
How many of these are published in open access journals?	2
How many of these are published in open repositories?	
To how many of these is open access not provided?	
Please check all applicable reasons for not providing open access:	
☐ publisher's licensing agreement would not permit publishing in a repository ☐ no suitable repository available ☐ no suitable open access journal available ☐ no funds available to publish in an open access journal ☐ lack of time and resources ☐ lack of information on open access ☐ other[23]: ……	

15. How many new patent applications ('priority filings') have been made? *("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).*		
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	Trademark	
	Registered design	
	Other	
17. How many spin-off companies were created / are planned as a direct result of the project?		
Indicate the approximate number of additional jobs in these companies:		

18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:

☐ Increase in employment, or	☐ In small & medium-sized enterprises
☐ Safeguard employment, or	☐ In large companies
☐ Decrease in employment,	☒ None of the above / not relevant to the project
☐ Difficult to estimate / not possible to quantify	

[22] Open Access is defined as free of charge access for anyone via Internet.

[23] For instance: classification for security project.

19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (*FTE = one person working fulltime for a year*) jobs:	*Indicate figure:*
Difficult to estimate / not possible to quantify	☒

I Media and Communication to the general public

20. As part of the project, were any of the beneficiaries professionals in communication or media relations?

☐ Yes ☒ No

21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?

☐ Yes ☒ No

22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?

☒	Press Release	☒	Coverage in specialist press
☒	Media briefing	☒	Coverage in national press
☒	Brochures /posters / flyers	☒	Website for the general public / internet
☒	webinars	☒	Event targeting general public (conference, exhibition, webinars)

23 In which languages are the information products for the general public produced?

☐	Language of the coordinator	☒	English
☒	Other language(s)		