Bioeconomy in Flanders

The vision and strategy of the Government of Flanders for a sustainable and competitive bioeconomy in 2030

Vlaamse overheid

Content

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Prologue

Dear Reader,

In a bioeconomy, biomass is sustainably produced and used for a range of applications. Innovation is key: a bioeconomy can only exist through innovation, and also contributes itself to a region's strength of innovation. Such an economy offers huge opportunities for, among other things, the further development of a circular economy, the optimal use of raw materials and economic growth. The importance of the bioeconomy in Flanders will only increase in the future.

Flanders is therefore emphasising a sustainable bioeconomy, in line with the Flanders project for the future, Flanders in Action (Vlaanderen in Actie – ViA), which aims to develop Flanders into an economically innovative, sustainable and socially warm society by 2020.

The bioeconomy applies by definition at cross-sector, cross-policy and cross-border level. Such a complex concept demands a long-term vision, supported by the entire Flemish government. For this reason, in 2012 the Interdepartmental Working Group for the Bioeconomy (IWG BE) was set up.

This publication sets out the first results of the IWG BE: the Flemish vision and strategy for a Flemish bioeconomy, as approved by the Government of Flanders on 19 July 2013. The vision and strategy came into being in consultation with various stakeholders.

If you would like to find out more about the Flemish bioeconomy and the initiatives being taken by the Government of Flanders in that regard, you can contact us via bio-economie@vlaanderen.be. If you would like to be kept informed of our activities in the future you can send us an e-mail with 'bioeconomy contact' in the subject line.

Happy reading!

The Interdepartmental Working Group for the Bioeconomy


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Bioeconomy in Flanders – The vision and strategy of the Government of Flanders for a sustainable and competitive bioeconomy in 2030

1. Context

In setting up the Flemish Interdepartmental Working Group (IWG) for the Bioeconomy, the Government of Flanders provided the initial impetus for the development of an integrated, cross-policy approach to a sustainable and competitive Flemish bioeconomy. Over the past year the Departments of Economy, Science & Innovation (EWI), Agriculture & Fisheries (LV), Environment, Nature & Energy (LNE), Work & Social Economy (WSE) and Education & Training (OV), together with their agencies VITO (Flemish Institute for Technological Research), ILVO (Institute for Agricultural and Fisheries Research), OVAM (Public Waste Agency of Flanders), VEA (Flemish Energy Agency), ANB (Agency for Nature and Forests in Flanders), VMM (Flemish Environment Agency), VLM (Flemish Land Agency), VDAB (Flemish Employment and Vocational Training Service), IWT (Agency for Innovation by Science and Technology) and Enterprise Flanders, worked on a vision and Flemish strategy for the long term. In this document the IWG for the Bioeconomy wishes to report on its activities.

Flanders has opted to develop a sustainable bioeconomy as a transition strategy to respond to the threat presented by the exhaustion and use of fossil raw materials. In addition, Flanders wants to be ready to cope with major societal challenges such as population growth, climate change, the increasing scarcity of other raw materials, pressure on ecosystems and economic development. A sustainable Flemish bioeconomy provides opportunities for green growth and job creation, the further development of a circular economy, cross-border clustering, strengthening of competitiveness and the potential for research and innovation in Flanders.

A transition to a sustainable bioeconomy demands a vision and a long-term strategy, supported by the entire Flemish government. This memo describes this vision and strategy of the Government of Flanders for a Flemish bioeconomy.

The vision is based on a number of principles that are tailored to and supported by stakeholders through the joint opinion of 13 February 2013 of the advisory councils Minaraad[1] and SALV[2] in relation to the 'sustainable use of biomass in a bioeconomy'. Based on these principles, the opinion of these councils and the European strategy for the bioeconomy, the Government of Flanders has set itself a number of powerful ambitions that set out the socially desirable direction in which the bioeconomy must develop.

The bioeconomy was also identified in the Flemish Materials Programme of the ViA project as an important lever for coping with the major societal challenges facing Flanders. On the one hand, this

[1] = the advisory council on environmental and nature protection policy of the Flemish government – trans.
[2] = the strategic advisory council for agriculture and fisheries – trans.

vision and strategy implement a number of actions from this lever, and on the other hand they integrate concrete actions.

The strategy contains a number of strategic objectives which the Government of Flanders is convinced provide the framework for the (further) development of a Flemish bioeconomy. These objectives are set out in detail in a number of actions through which the Government of Flanders further develops the strategy in collaboration with the stakeholders.

On 19 April 2013 the strategic objectives of this memo were presented to the various stakeholders (business federations, civil society organisations, research institutions, etc.) that could play a prominent role in implementing this strategy. They were asked to discuss the actions together, comment on them from their position and complete them where necessary.

With this vision and strategy the Government of Flanders wants to send out a clear signal that it recognises the importance of the bioeconomy. By providing the right framework and facilitating matters where necessary, it hopes that the existing and future stakeholders within the bioeconomy will be able to detect and seize opportunities themselves. After all, the bioeconomy will only be able to develop extensively if all stakeholders commit to it.

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2. Definition

The bioeconomy includes both the production of renewable biological resources and the use of those resources and residual streams. These are used in (for example environmental/biotechnological) processes and are processed into valuable products such as food, animal feed, (biobased) products and bioenergy. More specifically, the bioeconomy includes, among others, the following sectors: agriculture, forestry, fishing, the food industry, the wood-processing sector, the pulp and paper industry, the environmental technology sector, the construction and infrastructure sector, the energy sector and industrial sectors such as the textile industry, the chemical industry (including the pharmaceutical sector) and the biotechnology sector, and finally the end-user/consumer and the logistics sector (recycling and waste collection). In a nutshell, the bioeconomy therefore includes all activities associated with the production of biomass[3] and the various ways in which this biomass[3] and its residual streams are subsequently used. The biobased economy is not explicitly defined in the European strategy, but following the logic of the abovementioned definition, it is that part of the bioeconomy in which biobased products and materials are made and biomass is used in processes.

The biobased economy is embedded in the bioeconomy (see figure 1).

Starting from this definition, the IWG is investigating how Flanders can best use its good initial position with a strong chemical industry, food industry and energy sector, intensive agriculture and horticulture and a high population density with large and well-managed material flows in the transition to a sustainable bioeconomy.

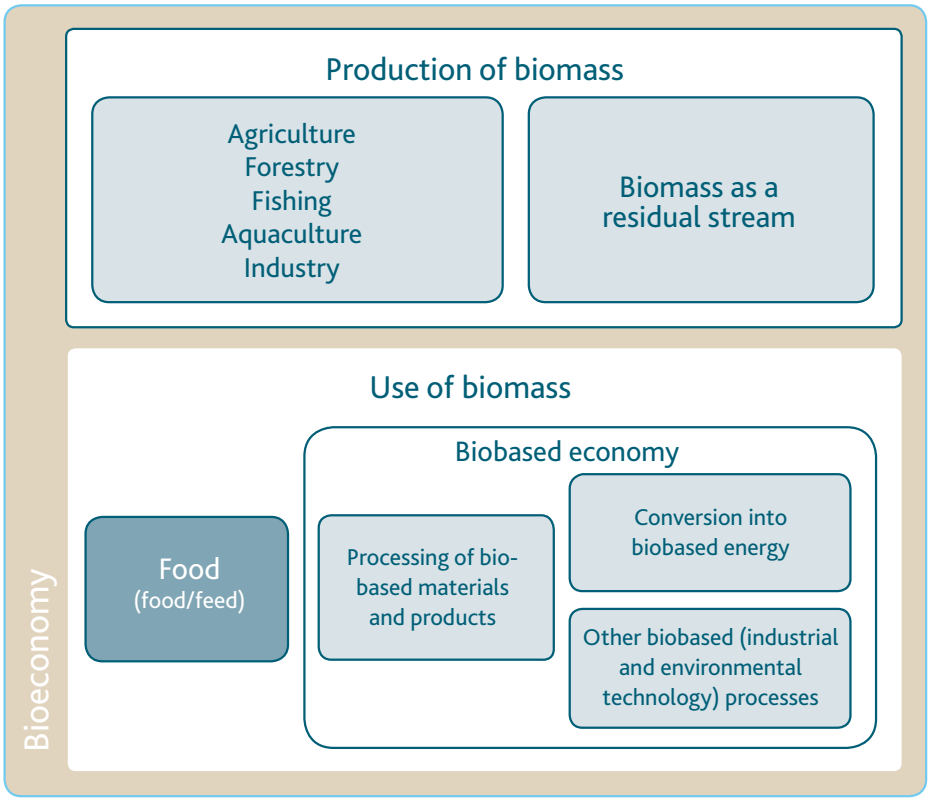

Figure 1: Based on a figure from the Minaraad and SALV recommendation 'Sustainable use of biomass in a bioeconomy' (2012)

[3] Biomass is vegetable or animal material, or material of vegetable or animal origin. (Minaraad and SALV recommendation)

3. Vision

3.1 Starting points for the bioeconomy in Flanders

3.1.1 The bioeconomy is necessary because of the major societal challenges

The development of the bioeconomy is necessary because solutions have to be found for the major societal challenges already facing us. The bioeconomy is an important tool for addressing these challenges in a sustainable way and in doing so being able to continue to guarantee the well-being of the population in the future.

One of the biggest challenges is to combat climate change, which is mainly caused by the use of fossil raw materials. The need to reduce greenhouse gas emissions, the exhaustiblity of fossil raw materials and the high dependence on imports of these raw materials have made a priority of the transition to alternative sources and renewable raw materials for materials and energy.

In addition, global agricultural production[4] will have to increase significantly if we want to meet the needs of the growing world population and food safety, with an increased demand for cereals, meat, animal feed or 'natural fibres' for habitat and clothing.

3.1.2 The bioeconomy must form part of a more sustainable economy, and thus be economically, ecologically and socially sustainable.

We must strive for a bioeconomy that respects the ecological and social capacity of the earth, by embedding socio-economic development in a smart, material- and energy-efficient circular system. This means focusing as a priority on system innovation that leads to a saving of energy and materials and that places (biobased) materials in closed circuits. These elements must be central to the bioeconomy in Flanders.

The resources we use to produce food, animal feed and biological raw materials and the ecosystems required to do so are already under considerable pressure. The production and use of biomass from agriculture, horticulture and forestry and biomass of marine origin must therefore become more sustainable. Among other things, the consequences of indirect changes in land use must be investigated further and accounted for.[5] Sustainability criteria along the entire chain are extremely important. Cooperation at European and international level is required for this, and must take account of (1) preserving the natural capital which generates biomass, (2) food safety, (3) the achievement of climate targets, (4) the availability of materials and energy, (5) the creation of sustainable socio-economic development and (6) the consequences of indirect changes in land use.

[4] While maintaining or even reducing the area devoted to agricultural land

[5] There is a scientific method for taking account of these changes (ILUC). Alignment with this method is therefore necessary.

In addition, the available amount of biomass is not unlimited, given the primary production capacity of biomass and the capacity of the ecosystems. Maximum utilisation of (organic) residual and waste streams, maximum recycling and the closure of circuits are essential framework conditions. To be able to endure, activities must generate sufficient added value to pay for the production factors used in line with the market. The added value of activities is increased when resources are produced as efficiently as possible on the one hand, avoiding waste and losses, and on the other are used as efficiently as possible, including making maximum use of residual and waste streams and closing circuits. To guarantee the effectiveness of the bioeconomy, we must strive to use biomass within the function (food, animal feed, materials, energy, etc.) that creates the greatest societal and/or economic value[6]. Primarily, greater efficiency must lead to a reduction in the demand for raw materials. The chain is powered by meeting a need where, as with ecodesign, consideration is given to the performance of functions before a product is produced.

Large numbers of people are involved, directly or indirectly, in the exploitation, cultivation and use of biomass. Employers, employees, users of the end products, residents of the exploitation sites, local residents of the area where end products are used: they all have their own interests. All these interests must be carefully considered. The involvement of all those concerned and respect for universal human rights are vital in this regard. Moreover: a sustainable and prosperous society must also take the rights and needs of future generations into account in such considerations.

[6] In accordance with the principles cited in 3.1.5

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In Flanders, the economic impact of and employment in biobased industry increased[7] between 2008 and 2010[8]. Dynamism on the labour market is characterised by two dimensions. The first is the volume of employment. Some occupations become more important and new ones arise, creating extra jobs. The second dimension of dynamism on the labour market, is the content of occupations and skills. Occupations mainly change under the influence of changing legislation, products and services, production methods, etc. Tasks will also change, and skills will also need to change to carry out these tasks properly.

An EWI study[9] reveals that the impact of the biobased economy (BBE) is already significant in Flanders. When analysing the economic impact and employment, it appeared that in 2010, up to 1.5% of the total Flemish gross margin and 0.8% of all Flemish employment were generated by the BBE. If one just takes the industrial sectors into account, then the BBE accounted for 9% of the gross margin for industry in Flanders and 5.7% of all employment. Another observation is that the Flemish BBE is growing, while the importance of industry in the Flemish economy as a whole is losing ground. It should be noted here that the primary production of biobased raw materials and the food industry were not included in the above figures in accordance with the definition, and the further processing of, for example, bioplastics into finished products in the furniture and motor industry or in construction is not included. Therefore, the indirect impact is even greater.

It also appears that in Flanders, biobased products (e.g. paper, wood, bioplastics and biochemicals) already create five times as much added value and ten times more employment than bioenergy. Almost half of the total gross margin from the BBE is generated by fine chemicals, biopolymers and bioplastics. These sectors are also characterised by a high degree of dynamism, growth and innovation.

3.1.3 The switch to an economy based on renewable raw materials requires a transition

A process of transition seems unavoidable in order to move from the current fossil economy to a bioeconomy. Such a process of transition can only be driven from a clear vision of the desired future. A sustainable bioeconomy cannot be achieved simply by optimising products and processes. Structural changes are required in the systems that perform societal functions, such as the energy, materials, mobility, food and housing systems and more generally the consumption system.

To initiate this transition, we must think from a system's perspective, control the actions and decisions of individual stakeholders with a substantiated long-term vision, and develop and scale up innovations that fit in with this long-term vision.

Transition management requires networks in which forward-thinking players from government, business, civil society and science are involved. The government is expected to play a facilitating and

[7] Here, as opposed to the remainder of this document, we refer to the biobased economy and industry. This is because the studies carried out used the scope of the biobased economy, instead of that of the bio-economy.
[8] "How biobased is the Flemish economy?" (2010) UGent, for the Department of Agriculture and Fisheries, Monitoring and Studies section.
[9] "Sustainable use of and value creation from renewable raw materials for biobased industrial production such as biomaterials and green chemicals in Flanders." (2012) Cleverconsult in collaboration with UGent and VITO. For the Department of Economy, Science and Innovation. Note: this only considers streams that are used for biobased energy or biobased products.

guiding role, among other things by stimulating policy integration in a targeted manner and on a larger scale than currently, creating experiment areas and investing in networks.

Replacing fossil raw materials by renewable ones is a major challenge. At the very least, we must overcome the following obstacles to make this transition possible:

- biomass is highly heterogeneous in nature, with the result that a range of technologies is needed;
- new supply chains are needed that can handle the wide variety in quality but also the considerable variations in and sources of the biomass streams: seasonal variation, less obvious residual streams, impure streams, etc.;
- major efforts are needed in the field of research and development to develop conversion techniques that convert biomass efficiently into biobased products, electricity, fuels and heat;
- efforts are needed to develop these biobased products in a sufficiently high-quality and reliable way and also to provide consumers (citizens, businesses, governments) with clear and up-to-date information so that they are convinced to contribute to a more sustainable pattern of consumption in this way, with the necessary starting point being less use of materials and energy;
- both in Flanders and internationally, competition in land use for applications of biomass and with other ways of using land is increasing all the time;
- the labour market must be versatile enough to adapt to the changes that a transition to sustainability will bring about. A clear picture will be needed of the skills and talents that will be vital in the bioeconomy of the future to enable a proactive approach.

3.1.4 Biomass as a factor in the energy mix

It is important that our energy needs are also met. The well-being of man, industrial competitiveness and the general functioning of society depend on safe, guaranteed, sustainable and affordable energy (Energy Roadmap 2050). To make this vision feasible in the future, the current energy system will have to change dramatically. First and foremost, all our efforts must be focused on energy efficiency.

Wind and solar energy will play a more important role in the future. This means that the electricity network has to be converted into an intelligent network to coordinate demand and production as efficiently as possible. If we depend more on variable energy sources, solutions will also have to be developed for the storage of energy. Bioenergy plays a role in this because biomass can be stored relatively easily and used when other renewable energy sources are not sufficiently available. This contributes to the stability of the electricity network.

For a future energy system based entirely on renewable energy sources, biomass will probably also be required in heating processes and other applications[10] that cannot be satisfied with other renewable energy sources.

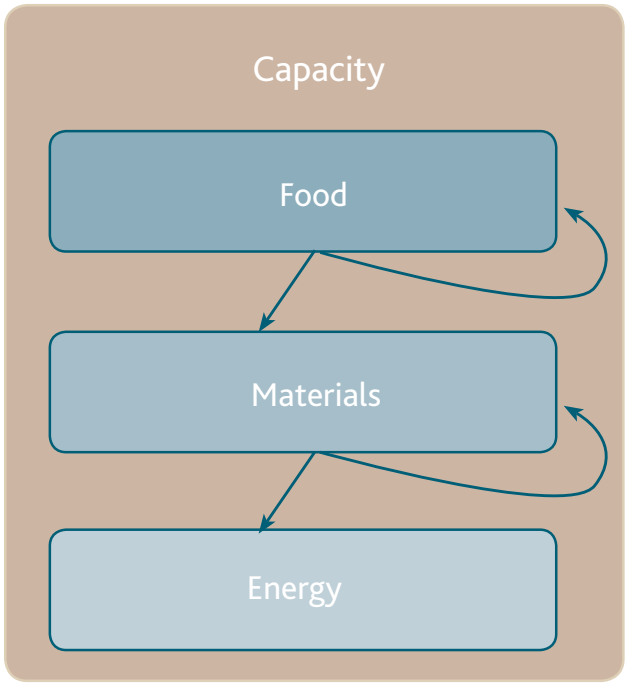
The visions of bio-economy and renewable energy must be coordinated. In an ideal scenario, cascading

[10] Such as aviation and shipping.

provides sufficient biomass to meet energy demands and to perform a specific role as a 'stabilising' energy source. This involves a scenario in which the primary focus is on energy efficiency and saving and where there is a balanced distribution between the various renewable energy sources. This means that the primary focus must be on producing energy from the sun, wind, water and soil. By developing and following up a flanking policy (product standards, emission standards, licensing and enforcement), the impact of biomass incineration on air quality will remain within acceptable limits, thus avoiding a conflict with air-quality targets.

3.1.5 In the Flemish bioeconomy the available biomass streams will be used according to an accepted cascade

This cascade shows the use and processing of biomass, taking into account the capacity of the environment. A cascade or sequence of priorities can be created based on economic, social or ecological criteria or a combination of these. Different cascades can be obtained depending on the priorities. Further study is required in this area, to allow the government to assess the effect of policy choices and then develop a long-term policy and formulate concrete long-term objectives in consultation with stakeholders.



The starting point is that biomass from primary production as well as from residual and waste streams must firstly be responsible for guaranteeing food safety (food and animal feed), secondly for use as a raw material, and thirdly for use as an energy source. When using biomass, the entire life cycle must always be taken into consideration.

Along the chains, the biomass must be kept in the production chain for as long as possible in its various forms through reuse, being split into different fractions and by utilising residual streams. In this way, economic and societal value can be generated several times from the same biomass. In other words, the biomass cascade must be chosen in such a way that maximum economic and societal benefits can be achieved. In the end, energy recovery through combustion will form the final step in the cascade for the majority of all biomass use.

3.1.6 The European strategy and action plan for a bioeconomy serves as a framework for the vision and strategy of the Government of Flanders

The Europe 2020 Strategy calls for a bioeconomy as a key element for smart and green growth in Europe. This bioeconomy will contribute significantly to the objectives of the Europe 2020 flagship initiatives "Innovation Union" and "A resource-efficient Europe".

To implement this, in February 2012, the European Commission approved a strategy and an action plan to increase the use of renewable resources in our economy and for them to be used in a more sustainable manner: "Innovating for Sustainable Growth: a Bioeconomy for Europe". This is designed to pave the way for a more innovative, sustainable and competitive European economy which reconciles food safety with the use of renewable raw materials for industrial purposes, taking into account the protection of the environment. The action plan describes the key measures the Commission will take to achieve the objectives of the strategy. The Member States are being invited to participate in this plan. The action plan is based on three pillars:

- the development of new technologies and processes for the bioeconomy;
- the development of markets and competitiveness in bioeconomic sectors;
- encouraging policymakers and other stakeholders to work more closely together, across industrial sectors.

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3.1.7 Learning from cooperation opportunities and inspiration from the strategies of other countries and regions

Several Member States and regions have already developed a strategy for a BBE or bioeconomy, or have started working on one. It is therefore only natural that the focus may vary from country to country. A number of countries such as Germany and Finland have taken a broader approach to the bioeconomy as a whole, while other countries such as the Netherlands, Sweden and several regions in France place the emphasis on the biobased economy.

An important issue that repeatedly comes to the fore is the importance of innovation. This is always framed within an integral policy. The Netherlands places the emphasis on biomass production, innovation, sustainability and coherent policy, while Sweden is focusing on innovation, market introduction, support for SMEs (small and medium-sized enterprises) and general supporting policy. Germany has established a national Bioeconomy Council with the focus on the economy, innovation, education and policy.

An important part of most strategies involves establishing or supporting a specific cluster and/or public-private partnership (PPP)[11]. We have recently seen an increasing number of joint ventures within Europe here, or even with regions outside Europe.

3.2 SWOT analysis of the bioeconomy in Flanders

To achieve the transition from an economy based on fossil raw materials to renewable raw materials, a strategy is needed that encompasses the entire value chain. This strategy was shaped based on existing policy documents, the results of studies and the input and recommendations of various stakeholders and experts from Belgium and abroad.

The SWOT analysis of the studies cited above[12] identified the following strengths, weaknesses, opportunities and threats:

- Strengths: knowledge base (biotechnology, process technology), (modern) agriculture, strong industry (food, chemistry, energy), well-developed logistics (land and waterways, port infrastructure), forerunner in collecting and recycling waste;
- Weaknesses: little area, densely populated, high environmental pressure, poor exploitation of research, fragmented research landscape, extensive regulation and complexity of the Belgian constitution, few funding programmes aimed at developing biobased applications;
- Opportunities: existing policy and initiatives, such as New Industrial Policy, transversal materials management action, biomass inventory, the IWG on food losses, innovation steering groups, cooperation with the Netherlands;
- Threats: little own technological development, growing competition from the cooperation of European clusters without the involvement of Flanders and other pilot installations, insufficiently coordinated regulations and policy.

[11] Example: SPIRE, PPP biobased industries 'BRIDGE'

[12] See footnotes 8 and 9.

Given this strong knowledge base and the opportunities that present themselves, there are sufficient chances to put Flanders at the top of the European bioeconomy and keep it there. The challenges here are policy coherence, further investment in research and development, sustainable production and European cooperation.

3.3 The Flemish bioeconomy in 2030: vision of the futured

We can sum up the vision of where we want to be with the bioeconomy in Flanders in 2030 in three powerful ambitions:

3.3.1 By 2030 Flanders will be one of the most competitive bioeconomy regions in Europe:

- by developing a coherent and integrated policy for the bioeconomy: a constructive collaboration between a policy for research and innovation, economy, agriculture, environment, materials, raw materials, energy, education and taxation, and a policy aligned as much as possible with European regulations and developments;
- in which the bioeconomy sector makes an important contribution to employment and economic growth in Flanders;
- in which all partners from the various related value chains enjoy sufficient benefits and added value;
- in which the strong industrial sectors that are the drivers of the bioeconomy have based major research and production centres in Flanders;
- with several new companies emerging from own research.

3.3.2 In 2030, Flanders will be one of the top regions in Europe for innovation and research relating to the bioeconomy:

- with maximum cooperation between governments, civil society, the academic world, research institutions, industry, logistics and primary production;
- with cooperation between and within the various sectors;
- with structured strategic basic research;
- with research projects and networks that involve the entire value chain with accessible upscaling infrastructure and financing for development and demonstration projects;
- with numerous new spin-off companies that convert innovation and research into economic activity;
- with a Flemish bioeconomy cluster that has set up collaborations on innovation and research with key bioeconomy regions in Europe and the world.


Photo: © http://www.morguefile.com

3.3.3 By 2030, Flanders will have created one of the most sustainable bioeconomies in Europe

- in which Flanders is recognised as a forerunner in the efficient and flexible use of biomass;
- in which all the biomass used is produced sustainably and deployed along the entire value chain and at least takes account of generally accepted sustainability criteria at European level;
- in which the bioeconomy guarantees sustainable employment based on a strengthened activation and skills policy;
- in which, as a general principle, biomass is firstly converted into food and high-quality biobased products, prior to energy recovery at the end of the life cycle;
- with material- and energy-efficient, environmentally friendly and 'zero waste' production processes;
- in which the government stimulates the market for sustainable biobased products with adequate policy-related and stimulating measures;
- in which the products placed on the market are of a high-quality value and reliability that convince consumers (citizens, businesses, governments);
- in which Flanders is a recognised partner in EU and international cooperation on knowledge sharing, harmonisation of regulations and generally accepted sustainability criteria;
- in which there is broad support for a bioeconomy among the key stakeholders in society.

4. Strategy

Research institutions, the business world, ports, civil society and consumers are the key stakeholders and players in the transition to a bioeconomy. The government has a framework-creating and facilitating role. To create this framework and achieve the vision, five strategic objectives (SOs) have been formulated.

SO1: The development of a coherent Flemish policy that supports and facilitates a sustainable bioeconomy.

- The policy must strengthen the knowledge network in the sectors of the bioeconomy and ensure better cooperation and coordination between the policy areas of research and innovation, economy, agriculture and fishing, environment, nature, energy, spatial planning, education and training, work and social economy and supporting taxation.
- The policy will develop a clear long-term strategy that will be coordinated with stakeholders and communicated to the public. This Flemish long-term strategy will take maximum account of European developments and Flemish opportunities.
- By testing all relevant policy decisions against the cascade principle, the government is more able to stimulate sustainable use of biomass for both food and other applications along the chain. This guarantees that measures taken are in line with one another.
- An analysis will be carried out of regulatory barriers, and initiatives will then be launched to ensure balanced regulation and support for the various applications within the bioeconomy, while not jeopardising other policy objectives.
- Since biomass is currently a major source of green energy in Flanders, the renewable energy policy must focus on other possible types of renewable energy.

SO2: To put Flanders at the top for education and training and research and innovation in future-oriented bioeconomy clusters.

- To bring about the bioeconomy, multidisciplinary research and innovation have to be supported across the entire value chain. Cooperation and knowledge transfer between all parties in the value chain will be encouraged.
- Although knowledge of the technical potential of the bioeconomy has increased in recent years, further scientific research is needed into a healthy balance between the production of food and animal feed, materials, chemicals and energy (cascade). This is an aspect that will evolve constantly and must be monitored. This will require close collaboration with the relevant stakeholders.
- Valorisation and demonstration projects, including investments in infrastructure, must make the transition possible between academic research and industrial production.
- Research and upgrading to stimulate the closure of circuits and a maximum focus on waste and residual streams must be further promoted and supported.
- Focusing on business model innovation and linking production sectors to recycling sectors.
- Supporting research into techniques and crops that optimise the yield of biomass economically, ecologically and socially.
- Collaboration opportunities with surrounding regions will be investigated to create research clusters.
- The attractiveness of Flemish research institutions and businesses as partners for participation in bioeconomy-related EU research projects will be boosted.
- Together with the transition to a sustainable Flemish economy, the demand for 'greener' employment profiles will also increase. There is a need for a better-trained working population able to adapt quickly to technological developments and new forms of work organisation. This transition needs existing skills to be adjusted and adapted rather than new training standards to be developed. The introduction of green emphases into training programmes is an important lever in strengthening the skills of employees in order to fill the sustainable jobs of the future. This is also in line with the goal of establishing a sustainable bioeconomy in Flanders.

Photo: © Bayer

Photo: © FISCH

SO3: Biomass is optimally and sustainably produced and used across the entire value chain.

- All components of biomass are used according to a cascade[13]. Key are optimal exploitation and utilisation of renewable raw materials with maximum economic and social value creation, while taking into account the capacity of the earth. An effort will also be made at all times to close circuits and enhance efficiency. At the same time, there will be a focus on organic waste and residual streams.
- Sustainability in all its aspects in local and European production and use is one of the most important criteria for a Flemish bioeconomy. Sufficient attention is also paid to optimal levels of organic carbon and other nutrients in the soil and to improving the quality of the environment.
- The sustainability of imported biomass must be examined and guaranteed against criteria. Given the international context in which a Flemish bioeconomy will operate, these criteria must at least be developed at EU level.
- Biobased materials are placed on the market in a high-quality (possibly through the development of standards, certificates, labels) and reliable manner, and are provided with clear and up-to-date information for consumers, so that these are more easily convinced to consume 'biobased'.
- Locally produced biomass is used as much as possible.

SO4: Strengthening of markets and competitiveness of bioeconomic sectors in Flanders.

- To create a bioeconomy, it is not enough to have industry switch over to using biomass in place of fossil raw materials; awareness must also be raised among consumers (citizens, governments and businesses) of the possibilities that the bioeconomy and its products can offer. To do this, the societal benefits of these products must be made apparent (possibly through the development of standards, certificates and labels). Consumers must be encouraged to employ more sustainable patterns of consumption with this information.
- Market development will be supported by the government, by playing a pioneer role by means of public procurement.
- The necessary policy measures must be developed for a uniform and stable availability of biomass for industrial applications. Sorted and recycled waste streams, secondary and residual streams will be involved as much as possible.

SO5: Flanders is a key partner within European and international joint ventures.

- International and interregional cooperation will be stimulated, not only to guarantee sufficient biomass and sufficient sales for the Flemish bioeconomy, but also to share and export knowledge.
- International, European, regional or federal agreements will be made on harmonisation between different policy objectives and requirements and the removal of barriers in regulations.
- Flanders cooperates in the development of generally accepted sustainability criteria at European level.

[13] See 3.1.5

5. Epilogue

The Interdepartmental Working Group for the Bioeconomy is responsible for the further development of the action plan and for monitoring its implementation. Each year the Working Group produces a report for the Government of Flanders on its activities and the actual implementation of the action plan.

The studies, opinions, documents, etc. listed below were used in the creation of this vision and strategy of the Flemish government:

- "Innovating for Sustainable Growth: A Bioeconomy for Europe", communication from the European Commission, 2012, can be consulted at http://ec.europa.eu/research/bioeconomy/pdf/201202_innovating_sustainable_growth_en.pdf
- "Sustainable use of biomass in a bioeconomy", Minaraad and SALV opinion (2013), can be consulted at http://www.minaraad.be/adviezen/2013/eigen-initiatief-biomassa
- "Seeds of the sustainable use of biomass", VITO (not yet published)
- "How biobased is the Flemish economy?", study for the Department of Agriculture and Fisheries, can be consulted at http://lv.vlaanderen.be/nlapps/docs/default.asp?id=1869
- "Sustainable use of and value creation from renewable raw materials for biobased industrial production such as biomaterials and green chemicals in Flanders", study for the Department of Economy, Science and Innovation, 2012, can be consulted at Sustainable use and creation of value from renewable raw materials for biobased industrial production such as biomaterials and green chemicals in Flanders | Vlaanderen.be
- "Transition in research – Research in transition", VITO, 2012, can be consulted http://www.vito.be/NR/rdonlyres/026CBF52-CEA7-4BEE-9C6B-E538C624C209/0/Transitie_final.pdf
- "Biomass Inventory 2011-2012", OVAM, 2013, can be consulted at http://www.ovam.be/jahia/Jahia/pid/1601

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- Department of Economy, Science and Innovation (EWI)
- Environment, Nature and Energy Department (LNE)
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