



**Policy analysis of  
COVID-19 measures with  
regard to the chemical  
sector in EU programmes.**

**Province of Limburg on behalf of the S3Chem project consortium**

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## List of abbreviations

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<b>NUTS2 - Nomenclature of territorial units for statistics</b>	NUTS is the hierarchical system that divides the economic territory of the EU to create regional statistics. Three levels: NUTS1. NUTS2 and NUTS3.
<b>REACT-EU - Recovery assistance for cohesion and the territories of Europe</b>	An extension of the crisis response and crisis recovery measures through additional investments
<b>RRF - Recovery and Resilience Facility</b>	Facility to mitigate the economic and social impact of the coronavirus pandemic and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions.
<b>ERDF - European Regional Development Fund</b>	Finance program to strengthen cohesion on a social, economic and territorial level in the European Union.
<b>ESF - European Social Fund</b>	Europe's instrument to help people getting a (better) job and creating fairer job opportunities for EU citizens.
<b>JTF - Just Transition Fund</b>	Fund to enable regions to cope with the social and economic impacts of the transition to a climate-neutral Europe.
<b>RIS - Regional Innovation Strategies</b>	Strategies for strengthening regional innovation
<b>CRII+ - Coronavirus Response Investment Initiative Plus</b>	It complements the earlier initiative by emphasizing more flexibility. CRII+ allows the non-utilised support of EDRF and ESF to be used to its full extent.
<b>OP</b>	Operational Programme

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# 1. Introduction

## 1.1. Reason for research

The chemical regions Limburg (NL), Asturias, Catalonia, Lombardy, Mazovia, Saxony-Anhalt and Wallonia have cooperated in the Interreg Europe Project S3Chem since 2016. The main objective for the regions is to strengthen their smart specialisation strategies in the chemical and bioeconomy sector. This is supported by the Regional Innovation Strategies (RIS) of all regions in which they prioritize the chemical and bioeconomy sector directly, or by focusing on the biobased or circular economy. Due to the importance of this sector, an analysis has been requested on the impact of the Covid19-crisis on ERDF financing on innovation in the chemical sector in the S3Chem regions. This concerns the impact on the ERDF programmes for the 2014-2020 programming, as well as the 2021-2027 programming period, the REACT-EU programmes and, the Regional Innovation Strategies for Smart Specialisation (RIS3) for both programming periods (2014-2020 and 2021-2027), which regions must prepare for ERDF investments in innovation.

The main questions of the analysis are:

- ***How did the pandemic affect regional-European funding for the chemical sector?***
- ***What kind of lessons can be learnt from it to make European funding more resilient?***

This analysis focus on the impact of the corona crisis on the ERDF financing of innovation in the chemical sector in S3Chem's seven partner regions. Question remains if the Covid19-crisis has impact on the short-term investments through REACT-EU. Also, if the crisis has impact on the long term when it comes to the new ERDF programmes and the R&D and Innovation Strategies (RIS3) of the regions regarding innovation in the chemical sector. Moreover, this report will analyse if lessons can be drawn for the project partners. The objective is to map the impact of the Covid19-crisis on the (European) financing of the regional economies and the chemical sector in the seven regions of S3Chem. All of this should lead to a set of good practices that is applicable in the participating regions and is transferable to other regions in the EU.

The joint analysis of the impact of COVID19 on EU financing in the S3Chem regions is based on the available and supplied documents, as well as interviews. First we have to mention that not all regions have implemented a REACT-EU programme. Secondly, there is also a difference in the status of the documents as regards the 2021-2027 programming period. The RIS3 documents have been established for the new programming period in almost all regions, but this was during the analysis not the case for the ERDF programmes. Last but not least, we have to mention that the interviews with the regions covered a period of four months. Therefore, all conclusions (and good practices) are based on the information available during the study period (March-July 2022), which could differ due to the status of the documents supplied and the date of the interview. Some of the findings and conclusions are based on the interviews. It has therefore been decided to display only limited citations.

## 1.2. EU Response in regional funding to the COVID-19 crisis

Before this can be mapped out, it is important to indicate what the European Commission (EC) has done itself about the COVID-19 crisis. As soon as the crisis broke out, the EU had to respond swiftly. Hence, the EU civil protection mechanism has been activated and the first funds were mobilised in March 2020 (Coronavirus Response Investment Initiative/CRII and CRII+). With CRII+ introduced the EC exceptional flexibility for the use of the European Structural and Investments Funds (ESIF) in response to the COVID19 outbreak.

During the following months, the EU had to support many Member States and other countries in various ways. As a result, the EC had to present a Recovery plan for all EU Member States. Therefore, the proposal for creating Next Generation EU has been presented in May 2020. Next Generation EU is a temporary recovery instrument with a budget over 800 billion euros. The Recovery and Resilience Facility (RRF) is the main feature of Next Generation EU consisting of grants and loans. Due to the RRF, national policies can arise. One of the important instruments of the RRF is the crisis and recovery package of which REACT-EU is part of. REACT-EU stands for 'Recovery Assistance for Cohesion and the Territories of Europe' and is and constitutes, as it were, the regional instrument of Next Generation EU. The main goal of REACT-EU is to continue and extend the crisis response and its repair measures. By doing so, the EC is hoping to build a bridge towards a long-term recovery plan. In order to achieve this, REACT-EU resources are utilized to fund projects that stimulate crisis repair capacities, but also innovation and sustainable development. The budget of REACT-EU is approximately 50.6 billion euros and the funds have been made available to the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the European Fund for Aid to the Most Deprived (FEAD). That means that REACT-EU can be deemed an extension of the ERDF- and ESF-programmes. Also, each Member State has to decide whether to make regional or national REACT-EU plans. For this analysis, the focus will be specifically on the ERDF and its programmes. Therefore, in case REACT-EU has been implemented at regional level, REACT-EU will be part of the analysis.

## 2. The regional state of play: Asturias (SPA)



**Inhabitants:** 1 million (INE, 2020)

**Regional GDP per capita:** € 24.216 (INE, 2020)

**Added value / share of national added value:** €24,529 billion,  
2% of the national added value (INE 2020)  
(2018 INE)

Asturias, located in the northwest of the Iberian Peninsula, is a region of 10,604 square kilometres and 1 million inhabitants. It is one of the 17 Autonomous Communities that make up the Spanish State. With 354 km of coastline, it has two ports: the goods port of Avilés and the port located in Gijón, El Musel, which is the principal bulk-carrier port of the Spanish port system. Asturias is a materials-producing region in which the University of Oviedo covers a wide range of scientific and technical disciplines to meet the demand for human resources. The region is specialised in manufacturing basic materials and thus, it has a focus on primary materials consumption. That leads to the generation of significant quantities of industrial waste, some of which have unique characteristics. As a result, this leads to collaboration between large companies and a change of model in the company-administration relationship.

### 2.1. Regional chemical sector

The Asturian population and economic activities are grouped in the central metropolitan area of the region. According to the Spanish National Statistical Institute, Asturias has a GDP per capita of €21.149,- (2020). Industry plays an important role in the regional economy and contributes to 22% of the Asturian Gross Value Added (2014 INE). The process industries represent 37% of industrial turnover and 27% of industrial employees. Major multinational groups have industrial sites in the region, some of which have a strong international influence. Moreover, Asturias is home to the only steel plant in Spain, servicing the entire steel production process. Furthermore, ArcelorMittal has an acclaimed R&D Centre in Asturias. Asturiana de Zinc plant is also based in Asturias and the largest electrolytic zinc plant in the world).

The chemical sector in Asturias is dominated by two multinational enterprises: Bayer and DuPont. The Bayer plant produces an important ingredient for Aspirin, DuPont produces a wide range of chemical products for the agricultural sector. Furthermore, DuPont has acted as pole of business attraction for eight other companies, representing all together more than 2.7000 employees.

The regional sector also has multiple medium companies with considerable strength that are characterised by their deep-rooted link to the region, whilst simultaneously undertaking diversified and globalised activity, such as Química del Nalón (carbo-chemical products) and Tudela Vegín SA (cement).

The main regional driving forces develop their activity in the field of basic materials e.g., steel, aluminium, zinc, cement, fibres, etc. or in the manufacture of intermediate or final products in which the chemical composition or internal structure is recognized by the market e.g. refractories, cast-iron and construction materials. Moreover, some specific strengths of the region have to do with the production of materials for application in heavy mechanical engineering, railway infrastructure or in armour and security elements.

Regarding R&D activities, these companies have worked simultaneously on their demands for new functionalities or improvements in the performance of their products through materials technologies. Besides this, the industrial materials development cycle is covered by the IDONIAL. Also, numerous research groups in the fields of chemistry and engineering are working on compositional processes, synthesis, characterization, structure and modelling of materials at the University of Oviedo and at the Carbon Science and Technology Institute (INCAR).

## 2.2. The impact of COVID-19 on the chemical sector

Regarding the impact of COVID-19 to the sector, most companies did not suffer too much from the pandemic, further to the logistical problems. Some multinationals were able to make the switch towards 'smart working' and, therefore, employees were able to continue their work. Nevertheless, in the post-COVID period they experienced a mismatch that made them to reschedule their production.

Moreover, the chemical sector in Asturias, like many chemical clusters in Europe, is facing the challenge of competing against Asia and therefore major investments towards differentiation by technology are required. On the other hand, companies consider that if the chemical industry will be recognized as a strategic industry in the future and will relocate production lines in Europe, it will be necessary to make a radical change of technologies since they must compete with technologies other than Chinese ones.

Another big challenge is the transition towards a circular economy. Moreover, if Europe wants to make a just transition, it must think about the global economy, avoiding different speeds. Asturian companies pointed out that infrastructure is needed, together with grants; and even a third leg which is the reform of the legal framework.

## 2.3. The regions responses and the selections of crisis instruments

In Spain, REACT-EU is not focused on innovation, in fact, it is more focused on healthcare. The Recovery and Resilience Plan (RRP) concentrated towards the twin-transition. Therefore, there are funds reserved from the RRF for digitalisation and sustainability, but this is not yet available. Asturias waits for the Recovery and Resilience Facility to announce how the funds can be invested. For example, should it be focused on renewable energy or electric vehicles?

Regarding the Just Transition Fund (JTF), Asturias is one of the selected regions. In fact, it is the region in Spain which receives the largest amount of the Spanish JTF budget. This is meant to support the transition in the region, although the programme is not yet available. The region has a large process industry that received its energy from coal-fired power stations, which are shut down one by one. Therefore Asturias is supported with JTFs.

The new ERDF 2021-2027 programme is mainly a continuation of the former 2014-2020 programme. It is based on the RIS3, in which is barely referred to COVID-19. The first ERDF 2021-2027 call has recently been published, which is why it is too soon to determine if stakeholders are satisfied by the new programme.

## 2.4. RIS 2014-2020 and RIS 2021-2027: comparisons and COVID-19

### impact

The Asturian RIS3 2014-2020 included three strategic objectives, six fields of specialisation and seventeen different topics. The fields of specialisation were advanced and sustainable materials, new production models, supply network technologies, agri-food markets, ageing demographic and quality of life and the Asturias steel industrial hub. The Covid-19 pandemic did not have major impact on the regional innovation strategy.

The RIS3 2021-2027 is a redesign of the previous one with stronger focus on impact orientation. It includes as ambition to complete the innovation value chains and to reinforce the role of hubs to reach higher levels of technology demonstration.

#### Main conclusions:

- Asturias is a materials and semi-finished product producing region in which the University of Oviedo covers a wide range of scientific and technical disciplines to meet the demand for human resources.
- The pandemic had limited effects on the contents of the RIS3 and the OP of 2021-2027.
- Asturias is the region in Spain which receives the largest amount of JTF funds.
- With regard to the impact of COVID-19 to the Asturian chemical sector, most companies did not suffer too much from the short-term effects of the pandemic. Moreover, multinationals were able to make the switch towards 'smart working' and therefore, employees were able to continue their work.
- As there is mostly process-industry in Asturias, COVID-19 had no major impact on the amount of innovation related investments in the region, even though some of them were already developing a very intensive innovation activity.



### 3. The regional state of play: Catalonia (SPA)



**Inhabitants:** 7,758 million (Statistics Catalunya, 2022)

**Regional GDP per capita:** € 31.596 (Statistics Catalunya, 2022)

**Added value / share of national added value:** € 244 billion, 20% of the national added value (Statistics Spain, 2021)

Catalonia is an autonomous region in the Northwest of Spain at the Iberian Peninsula. The region is divided in four provinces (Barcelona, Girona, Lleida and Tarragona). Capital of the region is Barcelona, the second biggest city of Spain (1,7 million inhabitants).

#### 3.1. Chemical sector in Spain

The chemical industry is a key player of the industrial sector in Spain. In fact, in 2020 it represents 5.5% of the national GDP and 3.7% of total employment. The chemical industry is the second largest exporter in Spain with a turnover of € 64,519 million.

#### 3.2. Regional chemical sector

The chemical sector of Catalonia is the second largest manufacturing sector of the Catalan economy and the main exporting sector. It provides a broad range of chemical products: from raw materials and basic chemical products to specialized chemical products like paints, varnishes, coatings, cosmetics, pesticides and other agrochemical products. Raw materials and basic chemical products contribute 60% to the total turnover and 36% to the total workflow of the Catalan chemical industry.

The region has three chemical poles: Barcelona, Vallès and Tarragona, featuring chemical industry companies at different levels of the value chain, besides offering services for chemical companies. The chemical poles have an important logistics infrastructure, where the ports of Tarragona and Barcelona stand out, with multimodal facilities adapted to the chemical sector. The port of Tarragona imports raw materials that are used for production processes in the chemical sector, and exports the products derived from the raw materials. It is therefore the biggest petrochemical cluster in Southern Europe.

The Port of Barcelona and the Port of Tarragona act as multimodal distribution facilities for the chemical sector.

The Catalan chemical industry includes large companies like Shell, Bayer and BASF, as well as SMEs. The sector has in total 1.053 companies (2019), which includes 30,3% of the total of chemical companies in Spain. They provide around 38.000 direct jobs (2019), which includes 38,4% of all Spanish workers in the chemical industry.

### 3.3. The impact of COVID-19 on the chemical sector

During the COVID-19 crisis, the chemical sector was considered as essential. Therefore, the production processes continued during the lockdown. In fact, companies in the chemical sector that were able to contribute to the COVID-19 crisis by responding to the needs quickly, even increased their production. However, regarding the innovation activities of the chemical sector, due to the COVID-19 crisis, these needed to stop. As a result, some innovation activities were able to recover after the crisis, and some innovation activities stopped completely without recovery. Next to that, innovation activities did also adapt their activity to respond to the newly occurred challenges that the society faces, after COVID-19, by changing their objectives. For example, a company focusing on animal health has changed their activities to public health.

### 3.4. RIS3CAT 2014-2020 and RIS3CAT 2021-2027: comparisons and COVID-19 impact

This part of the analysis will focus on both RIS3, for the period of 2014-2020 and 2021-2027. Firstly, we highlight the most important components of the RIS3CAT for the period of 2014-2020. Afterwards the changes made for the new RIS3CAT for the period 2021-2027 will be introduced as well.

The RIS3CAT 2014-2020 has been built around an analysis of the strengths, weaknesses, opportunities and threats of the Catalan economy. From this analysis, three vectors were identified that will contribute to the vision of Catalonia. The first vector focuses on the Catalan industrial tradition, whereas the second vector focuses on the sectors such as food, health, leisure and lifestyle and the overall wellbeing of people. The third vector has the goal to make the Catalan economy greener. The activities in the third vector focused on efficient use of natural resources.

Next to the three vectors, the RIS3CAT 2014-2020 focused on four strategic objectives and four complementing pillars:

Strategic objectives	Pillars
Modernize the business fabric by ameliorating the efficiency of production processes, internationalization and the reorientation of sectors towards actions with greater added value	<b>Leading sectors</b> – Focuses on seven leading sectors with the ability to turn the Catalan economy towards a growth model that is more inclusive, smarter and more sustainable.
Through research and innovation, promote new emerging economic activities and develop new market niches	<b>Emerging activities</b> – focuses on identifying new economic opportunities in sectors that are emerging based on technological capabilities and synergies between sectors that are related.
Connect technological and creative capacities to existing and emerging sectors, consolidate Catalonia as a European knowledge hub	<b>Crosscutting enabling technologies</b> – the main tools for creating new scientific, technological and economic opportunities.

<p>Increasing competitiveness, guiding public policies towards concentrating innovation, improving the Catalan innovation system, internationalization and entrepreneurship</p>	<p><b>Innovation environment</b> – focuses on improving the innovation in Catalonia</p>
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Another important component of the RIS3CAT 2014-2020 is the shift from a triple-helix model to a quadruple-helix model, including the users of products and services.

In comparison to the RIS3CAT 2014-2020, the approach for the RIS3CAT 2030 is more mission-based, meaning that there is more attention being paid to societal challenges. The RIS3 2021-2027, is also referred to as RIS3CAT 2030, since 2030 will be the year that the RIS3 actions will be implemented.

According to the interview, the new RIS3CAT is being constructed based on consultation from experts and ministers. The chemical sector itself has not been specifically mentioned in the new RIS3CAT. Nevertheless, the chemical industry is a part of e.g., circularity, sustainable energy and other objectives. Therefore, the chemical sector is naturally a part of the transition to a sustainable Catalonia.

The RIS3CAT 2014-2020 is still seen as valid. However, in comparison to the RIS3CAT 2014-2020, the new RIS3CAT does not focus on specialization areas such as the three vectors mentioned above, but it rather focuses on instruments aimed at strengthening business competitiveness, responsible research and innovation system while also promoting the transition to a greener, more digital and fairer socioeconomic model. The key role is social innovation.

Two words in specific are reoccurring in the RIS3CAT 2030: *Transformative* and *responsible*. *Transformative* describes the research and innovation promoting substantial change in production systems and contributing to the creation of new digital and technology-based industries. *Responsible* refers to all relevant stakeholders, e.g., researchers, companies, public administrations, collaborating in research and innovation aiming to align processes and results with the expectations, values and needs of the Catalan society.

### 3.5. Region's response

During the COVID-19 pandemic, as learned from the interview, own resources of Catalonia were redirected to other investments and thus other priorities. Those resources are, among other things, used for co-funding the ERDF programme. This resulted it in a slowdown of investments within ERDF programme 2014-2020.

Catalonia's reaction to the COVID-19 crisis is also visible in the RIS3CAT 2030. The new RIS3 focuses on how to solve challenges that the Catalonian society is facing. The interviewee mentioned that it has come to the surface that it is important to focus on the society as a whole, and not one sector in particular. In fact, the COVID-19 crisis has taught the region the importance of cooperation and interconnection between different sectors to find a solution to several topics together.

According to the interviewee, the REACT-EU programme in Spain was nationally. This was mainly aimed at sectors mostly affected by the COVID-19 crisis, such as the hospitality industry and health industries, as well as to those sectors who have suffered more with confinement, like all those related to tourism. In Spain, a large part of the GDP is related to tourism.

Furthermore, there has not been systematic contact with the stakeholders of the chemical sector. Most of the contact with stakeholders arose from queries where the sector needed e.g., advice.

### 3.6. ERDF-programmes 2014-2020 to 2021-2027

The new ERDF programme of 2021-2027 has not significantly undergone major changes comparing it to the previous ERDF programme of 2014-2020. The interviewee described the ERDF programme as rather traditional, meaning that the priorities stay the same as well as the structure.

With the ERDF programme 2021-2027, the stakeholders are involved through trade unions and interest groups. Currently, there is a survey for the stakeholders to react to the programme draft.

#### Main conclusions:

- The chemical industry is the main exporting sector in Catalonia. Barcelona, Vallès and Tarragona are the three chemical poles of Catalonia which feature chemical industry companies at different levels of the value chain. The port of Tarragona is the biggest petrochemical cluster in Southern Europe.
- Business was able to carry on as usual during the COVID-19 crisis because the chemical sector was essential. Companies in the chemical sector that were able to help to tackle the crisis, even increased their production.
- Innovation activities were influenced by the crisis. Either they stopped due to the COVID-19 crisis and recovered after or stopped without recovery. Other innovation activities have been adjusted to respond to the consequences of the crisis.
- The RIS3 for the new period is more mission-based. The societal challenges are the focus of the RIS3CAT 2030. The COVID-19 crisis highlighted the importance of cooperation and interconnection between different sectors.
- The chemical sector is not a specific part of the RIS3CAT 2030 but is rather interwoven with other sectors working towards the transition of a sustainable Catalonia.
- The new ERDF programme has not changed. The priorities and the structure will remain the same.

## 4. The regional state of play: Province of Limburg (NL)



**Inhabitants:** 1.1 million (CBS, 2021)

**Regional GDP per capita:** € 40.475 (CBS, 2021)

**Added value / share of national added value:** € 40 billion, 5,64% of the national added value (CBS, 2021)

Limburg is the Dutch province with the highest share of industry (21%) in the regional added value (Panteia, 2021). The chemical sector is an integral part of the industrial branch. The chemical sector in Limburg is unanimously linked to Chemelot, located in the southern part of the province ('Zuid-Limburg'). According to the Masterplan Chemelot 2030, around 20% of the activities within the Dutch chemical sector take place in Chemelot. The companies in and surrounding Chemelot employ around 8,000 people.

### Regional chemical sector

Chemelot is one of the largest chemical clusters of the Netherlands and an industrial complex of 800 hectares specifically dedicated to the chemical sector. It hosts high-profile companies such as Royal DSM and SABIC. Chemelot is located in the centre of the so-called ARRRA chemical cluster, consisting of Rotterdam (NL), Antwerp (BE), Ludwigshafen and the Ruhr Area (both DE). The ARRRA Cluster provides around 340.000 jobs and is responsible for 40% of the European turnover in the chemical sector.

Once an integral part of the Dutch mining industry, Chemelot started shifting the focus to the petrochemical industry as the mines closed in 1967. During the 1970s, the focus shifted to fine / specialty chemicals and materials. Currently, ammonia is produced in the northern part of Chemelot and linked to other factories with a pipeline system. In the southern part, naphtha crackers produce (petroleum-based) intermediate products such as ethylene and propylene that are subsequently converted into plastics, rubbers and other materials.

The unique selling point of Chemelot is the tight-knit ecosystem that involves all partners - from knowledge institutes and startups to established multinationals.. The Brightlands Chemelot Campus (BCC) is an organization that is constantly evolving. Together with Chemelot Industrial Park it forms one of the largest research and industrial sites in Europe.

Enjoying national status, Brightlands Chemelot Campus is a breeding ground for materials science and innovation, and aspires to become the leading technological hotspot in the field of high-quality materials, chemistry and cell science. The Chemelot Campus will achieve this by bringing together business, (applied) research and education in one unique, open and innovative ecosystem. As such, the campus generates the added value which is necessary to address the global issues of sustainability and health. BCC is designed to proactively foster community building, with meeting spaces and even sport facilities. The BCC brings together knowledge institutes (such as Maastricht University, Eindhoven University of Technology, RWTH Aachen University, Fraunhofer and newly set up ones like CHILL, AMIBM, Brightsite

and Brightlands Materials Center, as well as startups. Moreover, the physical design of BCC ensures that visitors immediately get to know more about chemical innovations that resulted from cooperative efforts.

The province of Limburg sets the ambition to become the first Circular Hub in Europe with Chemelot at the centre of a circular chemical industry. This led to an alliance of companies, knowledge institutes and regional governments, in the shape of a 'Chemelot Circular Hub'. The cooperation is based on four 'pillars': circular innovations, circular competences (human capital), circular fundamentals (adequate infrastructure and logistics) and circular society (innovations and social improvement). Each pillar has its dedicated flagships and foreseen relevant investment areas with the aim to mobilize funding on different levels – from regional to European. The ambitions of the Chemelot Circular Hub amount to a public-private investment of at least € 4 billion until 2030 in addition to planned investments.

### **The impact of COVID-19 on the chemical sector**

There was a short lived adverse effect on the Dutch economy due to COVID-19 as a whole, leading to a fall in GDP by 3.8% from 2019 to 2020. However, the adverse effects proved to be temporary as the national and regional economies largely returned to pre-lockdown levels in the second quarter of 2021. The stakeholders<sup>1</sup> conclude that usual operations carried on at Chemelot without any complications. The experienced adverse impacts mainly related to expansionary activities, such as the attraction of new (international) clients and innovation and research. The first aspect was exacerbated by travel restrictions. The interviewees confirm the conclusions of the stakeholders and highlight that adverse effects still may arise in the long run as expansionary activities usually take some time to pay off.

### **From 2014-2020 to 2021-2027: the chemical sector and COVID-19**

The Netherlands has four ERDF operational programmes (OPs), each linked to a Dutch region that consists of various provinces. Each region has control over its own budget and the management authorities (MAs) have the option to gradually open the programme and divide their budgets. The relevant ERDF OP in this case is 'OP Zuid' covering the three southern Dutch provinces Limburg, Zeeland and Noord-Brabant. The 'OP Zuid' RIS3 and OP 2014-2020 were influenced by the sector-led 'Topsector' policy of the Dutch national government of 2011<sup>2</sup>. Unsurprisingly, the documents demonstrate a clear sectoral focus.

Due to their regional economic impact, high tech systems and materials (HTSM), chemistry and agrifood were defined as sectors of primary importance. In contrast, life sciences & health, logistics, biobased economy and maintenance were considered important sectors from the perspective of their innovative potential and their national relevance. The OP translated the goals of the RIS3 into priorities and focus areas - being 1B (stimulation of research and innovation, development of connections and synergies) and 4F (research and innovation in relation to low carbon technologies). 4F focuses on the built environment and falls out of the scope of this study. 1B is relevant for this study as it is specifically dedicated to stimulating innovation in the mentioned sectors.

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1 To collect input, the province of Limburg organized a stakeholder session and shared its main outcomes (summarized) for this study. The session was attended by specific representatives from selected organizations, the organizations being Brightlands Chemelot Campus, Maastricht University, Stimulus ERDF Programme Management, Chemelot InSciTe, Innosyn, the Regional Development Agency of Limburg (LIOF), the Brightlands Material Centre and the province of Limburg.

2 The aim of this policy direction was to stimulate cooperation between industry and knowledge institutes on specific, distinguished Dutch sectors, the chemical sector being one of them

The priority was further divided into specific aims, being:

- **1B1: Innovation systems and SME-participation** (corresponding project types: cooperation and networking between specifically companies and / or knowledge institutions and living labs)
- **1B2: Strengthening SME valorization to find solutions for societal challenges** (corresponding project types: driving generated research and knowledge towards the market, strengthening and supporting business capacities of SMEs, risk funds)
- **1B3: Human capital within the prioritized sectors** (corresponding project types: innovative learning-, working- and research spaces, online platforms to connect talents to potential employers, cooperation networks between companies and educational institutes, innovative facilities for training etc.)

The calls throughout the programming period 2014-2020 were each dedicated to one specific aim. Additionally, each project needed to be linked to at least two sectors to stimulate 'cross-overs' – with one being the primary and the other the secondary. According to the OP 2014-2020, the total EU contribution lies at € 109 million excluding technical assistance. The largest part by far - of € 75 million - went to the 1B priorities. The priority 1B1 had the largest budget of around € 43 million and the highest amount of calls (six in total). 1B2 and 1B3 had a comparatively smaller budget and less frequent calls, respectively around € 21 million with three calls and around € 11 million with two calls.

The Managing Authority concluded in October 2017 that HTSM dominated in terms of the share of approved projects (48%) of the calls that have been launched until that moment (1B1 and 1B2). In comparison, the shares of the chemical sector and agrofood have been significantly lower. Consequently, the choice was made to make the alignment with the least dominant sectors – biobased and logistics – a precondition for the following 1B1 call in March 2018. The inspiring good practice in Lombardy - discovered as a part of the S3CHEM project – played a large role in the decision to open sector-specific calls. While the impact on of this intervention on the chemical sector may seem limited – biobased projects often involve the chemical sector.

The ERAC EU-funding database<sup>3</sup> confirms the dominance of the HTSM sector with a total grant amount of more than € 27 million. The next sector on the list is energy with a funding amount of more than € 14 million. The chemical sector takes the third place with € 10 million. Agrofood follows closely with a little less than € 10 million. Life sciences and health as well as logistics follow with a bit of a distance (being € 7.3 and € 5.5 million, respectively). Around € 23 million in EU-funding were specifically dedicated to Limburg. While HTSM is again the dominant sector (€ 6.6 million), the chemical sector demonstrates its importance to the province and follows on the second place with € 5 million. This also means that Limburg received about a half of the total EU-funds dedicated to the chemical sector. Yet, it needs to be taken into account that a large part of the 'other half' (€ 4,7 million) went to the province of Noord-Brabant.

While there is no doubt that the programme contributed to the chemical sector, some considerations need to be taken into account when interpreting these data. First, the database codifies 'energy' as a sector but

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<sup>3</sup> The ERAC EU-funding database provides a general overview of the received EU-grants (among which ERDF) in a specific region and / or from the viewpoint of a specific partner in the Netherlands - with the possibility to add a sectoral division. We aim at a high accuracy level. However, at the time of writing (May, 2022) the database had a smaller deviation in relation to the total EU-grant amount for the programme period 2014-2020 that is mentioned in the Operational Programme 2014-2020. Therefore, we cannot guarantee full accuracy in relation to the data linked the database.

not maintenance and biobased. This does not correspond to the original sectoral distinctions of the OP. Second, most projects have a link to two sectors. According to the ERDF programme manager, HTSM-projects were often linked to the chemical sector. In other words, the amount of financial support dedicated to the chemical sector can be expected to be higher in practice.

The pandemic did not prove to be a reason to adjust the programme. The interviewees confirmed that there was no impact on the contents of the programme as all calls were launched well before the pandemic. Moreover, the pandemic had a limited impact on the progress of the approved projects.

The first, directly observable change in the current programme period 2021-2027 is the lower budget in ERDF support (€ 105 million) made available for calls, excluding technical assistance. Yet, it should not be neglected that ReactEU enabled the continuation of the programme in 2021. The interviewees confirmed that the pandemic slowed down the programming process for 2021-2027 and – consequently – the launch of the first calls 'by at least a year'. These delays are explained by the programming steps that needed to be taken to implement ReactEU. The document analysis and interviews confirm that the pandemic had no impact on the contents of the programme.

An impactful change in the programme period 2021-2027 is the focus on five 'transitions' rather than sectors (the energy, raw materials, climate, agriculture / food and health transitions). This shift is inspired by the European Green Deal as well as the national policy of early 2019 that marked the shift from sectors to mission driven<sup>4</sup> innovation. Although the shift to transitions implies a less prominent role of the sectors, the RIS3 acknowledges that the most important economic players in the region remain organized along sectoral lines and entrenches the role of the sectors in the individual transitions. The chemical sector is explicitly mentioned in all – except for one – transition (health). The sector makes the most prominent entry in the raw material transition, where the importance of the chemical sector in relation to material technology, biobased economy and the recycling of plastics is highlighted. Another example is the chemical sector as an important challenge to be addressed in projects (e.g. on hydrogen) within the 'energy transition'.

The transitions are central to the first priority and its only specific priority ('a more competitive and smarter Europe' / 'research and innovation capacities and the uptake of advanced technologies'). Specifically, it is a precondition that submitted projects contribute to (at least) one of the five transitions. Living labs and testing beds are prioritized in both programming periods. While human capital was a specific priority in the previous programming period, it is missing in the current description of priorities. Moreover, the current programme puts more emphasis on cooperation in innovation projects between companies instead of companies and knowledge institutes.

The second priority focuses on energy efficiency, generation, distribution and storage. It also allows for projects outside of the built environment. The OP underlines the specific importance of the chemical sector, HTSM and maintenance to stimulate the energy transition in the industry.

With its sectoral focus and track record, the programming period 2014-2020 proved its importance. It is difficult to estimate in how far ERDF 2021-2027 will deliver similar results, as projects that target the

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<sup>4</sup> The Dutch government established 25 missions to reinforce the Dutch economy within the social themes energy transition & sustainability; agriculture, water & food; health & care and security.



chemical sector will only be allowed once the main aim is related to (one of) the transitions or sustainable energy. The first call of 2021-2027 is in the process of opening at this moment and consists of specific sub-calls. The topics in RIS3 and OP are further specified to focus areas. Each applicant must adhere to one of the transitions and at least one focus area. The interviewees expect a good opportunity structure for the chemical sector in Limburg – especially with regard to the broader ambition of the Chemelot Circular Hub. The interviewees also emphasize that the chemical sector is multifaceted and raise the possibility that the shift towards transitions could benefit certain facets and topics more than others. Moreover, they expect growing synergies between ERDF and the Just Transition Fund (JTF). While the JTF would allow for large scale projects targeted towards the chemical sector - ERDF could be beneficial for smaller scale demonstrations as a first step.

### **The regions responses and the selections of crisis instruments: ReactEU and the chemical sector**

In this section, we will detail the impact of ReactEU on the chemical sector. As in many other regions, ReactEU was considered an important instrument to counter the effects of the pandemic. In the Netherlands, ReactEU was implemented in the shape of financial additions to ESF and the ERDF OPs. ReactEU enabled South Netherlands to launch calls under the OP 2012-2020 with a budget of around € 47 million. This led to 92 full submitted projects of which 43 were approved. In practice, the calls had a two-fold structure with one generic call that was open to all provinces, and three calls, each being dedicated to one province.

In relation to the 'generic'<sup>5</sup> call, the choice was made not to focus on specific sectors, but on the transitions of the RIS3 2021-2027. Moreover, proposals had to contribute to goals that are in line with the general ReactEU aims, such as strengthening SMEs, digitalisation, a greener economy, resilient economic recovery, more market-oriented cooperation between SMEs, knowledge institutes and governments, and open innovation. While the interviewees confirm the importance of the transitions in the ReactEU call, they also add that that the transitions had a less narrow thematical focus in comparison to the first call of for the programming period 2021-2027 making it 'easier' for applicants to establish a link with (a) transition(s) in comparison to the current situation.

The province-specific calls had a narrower focus in line with the individual (economic) challenges the provinces experience in relation to COVID-19. The chosen focus of Limburg laid – amongst others - on developing a financial SME-support-mechanism. There was no obligatory focus on a specific sector, although the province articulated a 'preference' for sectors that were especially affected by the pandemic, such as the tourism or retail. Other focus topics were knowledge sharing and valorization within regenerative medicine and innovations with regard to measuring instruments to detect and record gravitational waves.

From the perspective of all approved projects (regardless of the province) – none had an explicit focus on the chemical sector. There were 18 projects in which partners from the province of Limburg were involved (but not always exclusively) with a funding amount of more than € 28 million. Of these projects, eight (with a total funding of around € 19 million) had an indirect link with the chemical sector.

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<sup>5</sup> Although the call is in principle generic, there is an assistance limit per province according to the regulation. This limit corresponds to around € 2.4 million for the province of Limburg

Despite the amount of projects with a link to the chemical sector, the stakeholder consultation as well as the interview confirmed that the ReactEU call did not translate to a boost for the chemical sector specifically. The stakeholders found that the procedure of pre-defining and specifying calls did not leave any specific room for the chemical sector.

#### **Stakeholder involvement:**

According to the interviewees, there are two levels to be taken into account when assessing stakeholder involvement. Stakeholders can be a part of the process of preparation of a new OP or RIS3 and / or be part of the consultations in relation to calls to be launched once the OP and RIS3 are fully operational.

- **ERDF 2014-2020 (OP and RIS3):** While the southern provinces and cities were operationally in the lead when it comes to programme development, it was ensured that relevant stakeholders would get involved. For instance, all Dutch 'topsectors' – among which the chemical sector – have been tackled in a separate process of interviews and data research. Moreover, a permanent reference group was set up to discuss the progress in programme development and has been described as a broad consultation by the interviewees without any sectoral dominance. Once the programme was launched, a specific steering group would get an influential role and advise the MA on the structure and contents of the calls. The steering group was composed of representatives of triple helix organisations, entrepreneurs, in some cases even mayors. While confirming that stakeholders were involved in different ways – the precise impact of stakeholders in the chemical sector is more indirect and difficult to evaluate. The interviewees added that non-official, consultations preceded each launched call to gather feedback. In the case of Limburg, the Regional Development Agency and 'all campuses [among which BCC]' have been regular discussion partners. Moreover, the interviewees confirm that there was a high degree of proactivity on the side of regional stakeholders in Limburg (among which representatives from the chemical sector) to discuss project ideas in relation to published calls to stimulate cooperation and avoid competition.
- **ReactEU:** The interviewees confirmed that there was no contact in relation to the preparation of calls or the programme with stakeholders from the chemical sector specifically. The MA mainly consulted the provinces due to the time pressure to launch calls as soon as possible. While the interviewees confirm that the provinces had contact with Brightlands Chemelot Campus, its influence on the contents of the calls remained limited.
- **ERDF 2021-2027 (OP and RIS3):** Although the cooperation structures (e.g. setting up various groups in the course of the preparation of the programme) largely remain intact – some new aspects have been added. Notably, 'transition meetings' had an important role in the programming as well as in the launch of the first call. Stakeholders were involved in meetings dedicated to get started with the first call like the Stimulus on the Road Meeting in April 2022 in Venlo. . That's why the conclusion that there is limited room for stakeholder involvement in the preparation of calls should not be drawn too hastily as the choice to work in this way had something to do with setting the thematic framework based on transitions by the policy makers and the urgency and time pressure to launch the first call.

### Main conclusions:

- Aside from the fact that Chemelot hosts high-profile international companies, its main unique selling point is the visibly tight-knit ecosystem of young companies, established multinationals and all regional knowledge and education institutes.
- Short lived adverse effects on the regional economy could be observed due to the pandemic. However, the businesses on Chemelot could largely carry on as usual. Yet, the pandemic put a brake on expansion in clients and innovation – which could translate to adverse economic effects in the longer run.
- The pandemic had limited effects on the remaining, running projects within the programming period 2014-2020. It also had very limited effects on the contents of the RIS3 and the OP of 2021-2027. However, it led to delays in the launch of the first call within the current programming period.
- Considering its sectoral focus and its proven track record in supporting projects dedicated to the chemical sector - it can be established that the programming period 2014-2020 provided a boost to the sector. It is difficult to estimate in how far the transition-based ERDF 2021-2027 will deliver similar results, as there is no precondition to involve a specific sector. However, the transitions link to the chemical sector and the interviewees estimate that a good opportunity structure will be present. And on top of that other dedicated EU funding like JTF will benefit the transition needed for the chemical sector In Limburg.
- In relation to the involvement of stakeholders in developing the programmes and specific calls, it can be concluded that there is room to have a say (except for ReactEU). However, this room is not specifically dedicated to the chemical sector nor does it allow the sector more access than others.

## 5. The regional state of play: Lombardy (IT)



Inhabitants: 10.06 million (Istat. 2021)

Regional GDP per capita: € 36.700 (Istat. 2021)

Added value / share of national added value: € 367 billion, 22% the national added value (Istat. 2021)

Lombardy is situated in the Northern part of Italy and has a population of more than ten million, which is about 16,5% of the Italian population. This makes it one of the most populated NUTS2 regions in Europe. The region comprises twelve provinces, with Milan as its capital. Lombardy's socio-economic system is facing a profound and sudden change due to the COVID-19 crisis, which has significantly impacted society and people's health, activity, productivity, employment and spending capacity in the area. The emphasis is on new infrastructural needs in digital connectivity and alternative mobility of people in cities.

### Regional chemical sector

As an industrial base, the North of Italy is responsible for approximately 78% of chemical employment in Italy, and Lombardy accounts for more than half of it. Also, in terms of number of companies, Lombardy is amongst the top five chemical regions in Europe. Overall, Lombardy can be deemed a high-value manufacturing region. Within the Green Chemistry Cluster, there is a strong focus on technologies in several sectors such as biorefineries, biomaterials, renewable fertilisers, catalysis and bioprocessing.

Lombardy is among the top five European regions by number of employees and local units, with the highest specialization index expressed as a share of national employment, even higher than sectors considered typical of the local industry such as metallurgy and mechanics (Istat, 2017). Mobilizing 44,831 employees (4% of the EU workforce in the sector), Lombard chemistry represents 42% of the national employees, and 31% of the companies constituting a pole of excellence that brings together universities and advanced service and plant engineering companies (Federchimica, 2020).

Lombardy was the region that contributed most to the national GDP in 2020, with €367 billion out of a total amount of €1,654 billion. That means that Lombardy represents 22% of the Italian GDP followed by the Lazio 11.3%, Veneto 9.2% and Emilia-Romagna 9% regions. The Lombardy population is about 16% of the total. The pandemic influenced the economic performance of all Italian regions, but Lombardy managed to limit the damage, even though the corona crisis had the biggest health impact in the North of the country. The North-East of Italy recorded -9.2% and the North-West -9% of GDP. All of this has been confirmed by The National Institute of statistics (Istat) as its data shows a great economic activity in Lombardy. The GDP

per capita in the region of Lombardy was €36,700 in 2020. As a result, the Lombardy GDP was higher than the Italian national average of €22,800. Only the Autonomous Province of Trento (€36,900) and the Autonomous Province of Bolzano (€44,500) have a higher GDP.

### **The impact of COVID-19 on the chemical sector in Lombardy**

No major policy changes took place directly from the Covid-19 crisis, although Lombardy suffered a massive economic backlash as many countries and/or regions did. Lombardy had already developed a strong digital infrastructure before the outbreak of the crisis and various SME's never stopped their operations during the pandemic and encouraged online shopping. Also, 'home working' has been introduced. Some companies even developed new products related to the battle against Covid-19.

The pandemic had a major impact on GDP, as it decreased by approximately 10% and there was no economic growth until 2021. Despite this, the economy was not yet at the pre-pandemic level at the end of 2021.

Moreover, the Lombardy Green Chemistry Association (GCA), the regional cluster of bioeconomy, is investigating the impact of COVID-19 on the chemical sector by survey. Some of the first results show that there is a small turnover growth visible. The GCA notes that enterprises used more different suppliers to respond to logistical problems created by the COVID-19 pandemic. Also, there are higher costs for raw materials, a small decrease in demand and higher consumption of green energy. Concerning innovation, there can be stated that there is no overall increase in investments in innovation. Nevertheless, there are higher investments in digitalisation.

Regarding the impact of COVID-19 on the Italian ERDF programme 2014-2020, the budget has not been used entirely. Funding has been used for crisis measures and purchase of medical products. This means that there was a higher spending of ERDF, but the expenditures were focused on new themes as this was allowed by the European Commission.

### **The regions responses and the selections of crisis instruments:**

Lombardy has identified five key priorities in the framework of its Regional Economic and Financial Document (DEFER) 2020-2023. This document explains the region's macroeconomic forecast and budgetary plan and the structural reforms Lombardy wants to implement. The key priorities are in line with the objectives of the 2030 Agenda and the main objective is to guarantee regional recovery and development. The first priority is "the relaunch of the economic and productive system", which aims to revitalize economic activities, attract investment and restore high-value activities. Second, "The beauty, nature and culture of Lombardy" is meant to revitalize tourism and reinvent the functionality of cultural sites. Thirdly, "the power of education, training, research and work" is designed to invest in human capital and restore competitiveness and productivity. Fourth, "the person in the first place" aims to fight poverty, vulnerability and disabilities. Finally, "a connected area, sustainable development" is meant to define integrated multi-sector strategies and create a connected and resilient area.

This was also confirmed in the Regional Economic and Financial Document (DEFER) 2022-2024. These key points, together with simplification, confirm the strategic priorities identified by the Lombardy region for the

2021-2027 EU programming period in the "Strategic Guidance Document for Cohesion Policy 2021-2027" (DIS). In fact, the DIS remains a valuable reference point for setting the priorities of the ERDF programme. In order to analyse Lombardy's multi-annual strategy, the Regional Innovation Strategy (RIS) must be considered as well.

The impact of COVID-19 on the use of ERDF programme funds 2014-2020 has involved shifting funds in order to meet unforeseen health costs. The reporting of health expenses advanced by the State amounts to 19.9% of the total ERDF programme funds however, it was possible to certify only 8.6% of the total used for the purpose. The rest of the planned and unused funds expenditure will return to the availability of the Program for other initiatives called Complementary Operational Programs (referred to in the next reprogramming of the POR expected within the year 2022).

### **RIS 2014-2020 and RIS 2021-2027: comparisons and COVID-19 impact**

The main objective of the RIS3 Strategy 2021-2027 for the Lombardy Region is to identify priority assets, resources, competencies and potential to lead the investments in research and innovation as well as industrial modernisation and technology transfer. The new regional RIS3 is therefore consistent with EU Cohesion Policy objectives as well as other current strategic orientations, targeting two main ambitious challenges. The first challenge is to support industrial transformation towards digital transition and sustainable development so to understand the evolving citizens' needs as quickly and effectively as possible. The second challenge is to increase the resilience and adaptability of the regional system to the rapid changes of the socio-economic and-productive system to ensure citizens safety and well-being. The impact of Covid-19 on the regional innovation strategy can be deemed limited. The impact of the pandemic was more visible in the accelerated innovation of some companies and the tremendous pressure on the health sector.

#### **Main conclusions:**

- Lombardy is amongst the top five chemical regions in Europe. Overall, Lombardy can be deemed a high-value manufacturing region. Within the Green Chemistry Cluster, there is a strong focus on technologies in several sectors such as biorefineries, biomaterials, renewable fertilisers, catalysis and bioprocessing.
- The pandemic had limited effects on the contents of the RIS3 and the OP of 2021-2027.
- The pandemic had a major impact on GDP, as it decreased with approximately 10% and there was no economic growth until 2021. Despite this, the economy was not yet at the pre-pandemic level at the end of 2021.
- Regarding the impact of COVID-19 on the Italian ERDF programme 2014-2020, the budget has not been used entirely. Funding has been used for crisis measures and purchase of medical products. This means that there was a higher spending of ERDF, but the expenditures were focused on new themes as this was allowed by the European Commission.
- Therefore, it can be stated that no major policy changes took place as a direct result of the Covid-19 crisis, although Lombardy suffered from a massive economic backlash as many countries and/or regions did.

## 6. The regional state of play: Mazovia (PL)



**Inhabitants:** 5.38 million (Statistics Poland, 2022)

**Regional GDP per capita:** € 22.125 (Statistics Poland, 2020)

**Added value / share of national added value:** € 112,2 billion, 22,6% the national added value (Eurostat 2018)

The Mazovian RIS3 2030 document portrays the region as innovative and characterised by high economic growth. It states that Mazovia is a well-developed macro-region and a 'globally recognised centre of innovation'. The RIS3 notes that in Mazovia, a distinction must be made between the NUTS 2 statistical units Warszawski stołeczny region & Mazowiecki regionalny region. The Warszawski stołeczny region is the central part of Mazovia, which is dominated by the Polish capital Warsaw. The Mazowiecki regionalny region consists of the peripheral subregions with different economic and social circumstances.

### 6.1. Regional chemical sector

Mazovia is the largest and richest region in Poland as the area covers 35 558 km<sup>2</sup> and over 22% of the country's total GDP. The latest data of Statistics Poland<sup>6</sup> shows that the chemical sector in Mazovia represents 17,84% of the entire Polish chemical sector. This is no surprise as the chemical sector and the ICT sector are the main activities among enterprises in Mazovia. S3Chem's 'Action Plan Mazovia Region' states that it is indicated that the Mazowieckie Voivodeship is responsible for about 26% of the total domestic production of chemicals, chemical products and pharmaceutical substances and medicines, and for approximately 14.5% of the total value of these products sold nationwide.

Regarding the chemical cluster in Mazovia, this is called 'the Center for Chemical Innovation "ChemInn"'. The aim of the Cluster is to increase competitiveness amongst enterprises within the chemical industry by developing innovative environmentally friendly technologies, processes and products. It also stimulates cooperation between the chemical industry and the science sector. The cluster aims to create a cooperation platform for its members to implement joint ventures. Also, there are some interesting examples of members of ChemInn who deal with very specific materials and markets. For example, one of the members deals with expanded polymers, which is a plastic material that is dealt with by very few enterprises on a national scale. This member strives to break the monopoly of BASF or KANEKA on this material. Another member of the cluster conducts research in the field of development of biodegradable polymer non-woven fabric, which could be used in the production of biodegradable protective masks type FFP2.

<sup>6</sup> Statistics Poland - central statistical office in Poland

## 6.2. The impact of COVID-19 on the Chemical sector in Mazovia

The situation in connection with the emergence and spread of the COVID-19 pandemic in the first half of 2020 was very difficult for the Mazovian region. The entire Polish economy suffered from a negative impact by the COVID-19 pandemic. Employment in industry (total) in the period from January to September 2020 decreased by 50,000 jobs compared to the same period a year earlier. In the chemical industry alone, 4,000 jobs were lost in the same period.

For the chemical sector, sold production decreased as much as PLN 16 billion. As a result, three of the four main branches of the Mazovian chemical sector recorded declines. The one branch that did not suffer from economic downturns had everything to do with the urgent demand for pharmaceutical supplies. This caused the production of pharmaceutical products to achieve growth, particularly in the first phase of the pandemic. Luckily, the situation improved slightly from July to September 2020. In 2021 – despite the ongoing pandemic – the situation of the industry had already improved significantly. That is to say that all individual branches of the Mazovian chemical industry have improved their results in terms of the level of sold production. More specific, three out of four branches recorded better results than before the outbreak of the pandemic in 2019. Also, the average employment in the chemical industry in January-September 2021 exceeded the results from before the pandemic.

The chemical sector in Mazovia ensures that innovations can take place in the field of green technologies and sustainable products. An example of this is the surfactant market, which is very dynamic and developing rapidly among global and local manufacturers. The development of professional detergents is particularly important during the pandemic. In addition, during an epidemic crisis, hygiene products are the basic weapon in the fight against viruses which is why there is a greater demand for components necessary for their production. The raw materials for this type of products are primarily surfactants, supporting thanks to their chemical nature active substances that deactivate the virus. The COVID-19 pandemic significantly intensified this trend, showing how important a clean environment and its impact on human health are.

## 6.3. The regions responses and the selections of crisis instruments

The difficult macroeconomic situation related to the COVID-19 pandemic, in particular in the second quarter of 2020, caused a visible decrease in interest from customers from e.g., the textile, polymers and washing industries. The investments were implemented in accordance with the assumed development and operational plans.

While analysing the available statistical data on capital expenditures incurred by the chemical industry in Poland, an upward trend can be observed. In 2019, the value of capital expenditures is about PLN 12.1 billion in 2019, whereas this reached PLN 13.4 billion in 2020. On top of that, an increase in capital expenditures by about 19% was recorded in 2021, finally reaching the value of PLN 15.9 billion. It should be pointed out that the data available for 2021 are incomplete, so this may still change. Nevertheless, this is a good prognosis for the chemical industry and for the entire economy, which is facing a recovery after the pandemic.



## 6.4. RIS 2014-2020 and RIS 2021-2027: comparisons and COVID-19 impact

The Mazovia region identified four strategic objectives in its RIS3 2021-2027 document. The first objective is to increase innovation activity in the region. By doing so, Mazovia aims to 'support the creation and implementation of innovations as part of regional smart specialisation through knowledge and technology transfer from the science sphere to enterprises. Also, the objective is to provide support for R&D in areas of smart specialisation. The second objective is to create strong and effectively operation value chains that connect enterprises. In order to do so, support will be offered for the creation and development of cooperative relations between entities from Warszawski stołeczny region and Mazowiecki regionalny region. Thirdly, the objective is to establish an effective ecosystem for creating and supporting innovations. Support instruments must be created for enterprises and scientific units to introduce innovations within the smart specialisation of Mazovia. Finally, the fourth objective is to increase the internalisation of the Mazovian innovation ecosystem. Therefore, the export of products and services based on innovative solutions will be supported and competitive advantages will be built through support for the implementation of business models focused on internationalisation. These key priorities in the RIS have not suffered from major impact due to the pandemic.

### Main conclusions:

- Mazovia is the largest and richest region in Poland.
- The entire Polish economy suffered from a negative impact by the COVID-19 pandemic. Employment in industry (total) in the period from January to September 2020 decreased by 50,000 jobs compared to the same period a year earlier. In the chemical industry alone, 4,000 jobs were lost in the same period.
- In order to avoid a slowdown of investments in the region, the Mazovian regional authority used the unspent funds from the ERDF program for the CRII+ initiative to make investment money available to SMEs in the form of financial instruments. The extension of support to include working capital expenditures the ERDF/CRII+ program helped SMEs to respond in a positive manner to the Covid19-crisis.
- Due to the use of ERDF funds, the Covid-19 crisis has not had a significant impact on investment in the industry. The investments were implemented in accordance with the assumed development and operational plans.

## 7. The regional state of play: Saxony-Anhalt (DE)



**Inhabitants:** 2.2 million (Statistik Sachsen-Anhalt, 2020)

**Regional GDP per capita:** € 28.652 (Statistische Ämter des Bundes und der Länder, 2021)

**Added value / share of national added value:** € 67 billion, 1,9 % of the national added value (Statistische Ämter des Bundes und der Länder, 2021)

With a 2020 turnover of around € 144 billion, the chemical industry is one of the largest in Germany. The total share of Saxony-Anhalt in the national turnover is more than 5%. Around 16% of the current employed persons in Saxony-Anhalt are working in the chemical industry. According to the data collected to shape the RIS 2021-2027, the chemical and plastics sectors have above-average employment figures and increasing employment numbers.

### 7.1. Regional chemical sector

Saxony-Anhalt encompasses the entire chemical value chain - from basic chemicals to processing industry and recycling. Aside from a few large companies and corporations, the landscape is particularly characterized by small and medium-sized companies - spread throughout Saxony-Anhalt. It should also be taken into account that the larger settled companies are representative companies, but generally not headquarters. The regional chemical sector clusters in five prominent chemical parks being Leuna, Bitterfeld-Wolfen, Piesteritz, Schkopau and Zeitz. The first two parks are the largest, as well as the oldest (respectively 1916 and 1893). The chemical parks have a strong pull factor due to the available services to companies (from logistics, to networking, security and energy). Another unique characteristic is the close cooperation between the chemical sites in relation to the exchange of raw and auxiliary materials. These material cycles ensure a reliable source of (mutual) supply (via pipelines).

The five chemical parks each have their own unique selling points:

- **Bitterfeld-Wolfen (1.200 hectares, more than 360 companies, around 12.000 employees):** The Park houses companies that are established players in the production of chlorine, phosphorus, dye and pharmaceutical and fine chemicals, such as Evonik, Bayer, AkzoNobel, Clariant, Glass, Heraeus, Millit Aromatics and Organica Feinchemie. Also, it is known for housing many SMEs and start-ups. The Technologie- und Gründerzentrum (TGZ, translating 'technology and start-up center') supports start-ups and expanding companies by providing laboratories, commercial space as well as business advice. This chemical park is also known for its activities in relation to hydrogen.
- **Leuna (1.300 hectares, more than 100 companies and around 10.000 employees):** The focus lies on - amongst others - crude oil and natural gas, syngas, methanol, refinery products, sulfur, polyamide, amines and ammonia. One of its other focus areas is energy generation - in a modern gas and steam turbine plant, InfraLeuna GmbH generates electricity and steam to ensure supply. Important research centres can be found in the park, specialized in chemical and biotechnological processes, environmental research and wind energy systems. The Fraunhofer project 'Hydrogen Lab Leuna' led to the launch of the first pilot plant for green hydrogen.

- **Piesteritz (220 hectares, more than 45 companies and around 1.500 employees):** The first and so far only agrochemical park (with a focus on - for instance - biodiesel, pharmaceutical glycerine) in Germany, opened for company settlements in 2005. The focus lies on industrial chemistry, NOx reduction, nitrogen, melamine and nitric acid. Aside from companies, the park also hosts an Agrochemical Institute – founded by the local Martin Luther University.
- **Schkopau - also known as the DOW Value Park (600 hectares, around 25 companies and around 3.000 employees):** DOW Value Park originated from the well-known chemical company Dow in 1998. Dow and the companies in the ValuePark offer a wide range of cracker products and plastics. Research centres with a focus on polymer synthesis and processing as well as silicone photovoltaics can be found in the park. Moreover, there is a support structure for smaller companies in the shape of the Merseburger Innovations- und Technologiezentrum II – also MITZ II (Merseburg Innovation and Technology Centre). MITZ II assists smaller in finding commercial space and by providing business and innovation advice as well as facilities.
- **Zeitz (230 hectares, around 50 companies and around 1.000 employees):** Zeitz is known for its many medium-sized and owner-managed companies. The focus lies adipic acid, oil refining and waxes. Over time, Zeitz positioned itself as the hotspot of green chemistry. Projects have - for instance - focused on solar power, biorefinery and the reprocessing of waste oil. The two local research institutes focused on environmental research, chemical and environmental technologies as well as biotechnology.

The future opportunities - amongst others revealed by the RIS 2021-2027 - include hydrogen (in the production of basic chemicals as well as storage for renewable energy), Industry 4.0' (or: the integration of data-use, digitization and automation in processes) as well as lightweight construction. Due to the existing energy infrastructure, Saxony-Anhalt is already a hydrogen pioneer. Lightweight construction is an opportunity due to the specialization in composites and plastic-based / metal lightweight materials.

The traditional chemical industry accounts for a high proportion of the total turnover of the industry in the (central) federal states of Saxony-Anhalt, Saxony, Thuringia and Brandenburg - which explains the strong cooperation between these 'Bundesländer'. The so-called 'Mitteldeutsches Chemiedreieck' (or: the "Central German Chemistry Triangle") is integral to the chemical sector in Saxony-Anhalt and refers to the industrial conurbation around the cities of Halle (Saale), Merseburg and Bitterfeld. Big names corresponding to this 'Triangle' include Bayer, Total and Dow.

## 7.2. The impact of COVID-19 on the chemical sector

According to the OP 2021-2027, the financial situation and investment opportunities for companies 'dramatically deteriorated'. Cumulative sales in the manufacturing sector in June 2020 fell by 8.4% in comparison to 2019. The RIS 2021-2027 reveals that innovation output (such as patents and newly founded companies) decreased as a result of the pandemic. The stakeholder consultation took place via a questionnaire. However, the response rate was low and did not allow for generalized conclusions.

## 7.3. From 2014-2020 to 2021-2027: the chemical sector and COVID-19

Each German federal state ('Bundesland') develops its own RIS and OP. The OP 2014-2020 of Saxony-Anhalt bases on six thematic aims, each entailing individual investment priorities. More than € 1,3 billion was made available to Saxony-Anhalt in ERDF-funds in 2014-2020.

A striking feature of the programming strategy is the central role of sectors with high societal and economic impacts (also 'Leitmärkte' - translated to 'guiding sectors'). The 'Leitmärkte' are: energy, mechanical and plant engineering and resource efficiency, health and medicine, mobility and logistics, chemistry and bioeconomy and nutrition and agriculture. Evidently, the Leitmarkt chemistry and bioeconomy links directly to the scope of this study. However, the links to other Leitmärkte are not to be neglected<sup>7</sup>. The section on chemistry and bioeconomy details market opportunities, such as lightweight constructions, the rubber performance industry, bioeconomy, the use of more sustainable residual raw materials as well as the transition towards a more sustainable chemical sector in general.

The first and largest priority axis 'strengthening of research, more technological development and innovation' with more than one third of the ERDF financial resources dedicated to it, corresponding to more than € 530 million, is the most relevant in line with the scope of this study. The axis contains two investment priorities: one focusing on research and innovation infrastructure and the other on the stimulation of investments in research and innovation by companies through the stimulation of cooperation between companies, research centres and knowledge institutes. The other priority axes focused on other aims and were not deemed relevant for this study.

The selected measures of the first priority include the expansion of the application-oriented public R&D infrastructure, application-oriented R&D activities at universities and non-university R&D institutions (entailing specific innovation projects of these institutes). The selected measures of the second priority include support for innovation projects by SMEs amongst each other and / or in cooperation with universities and non-university R&D institutes, knowledge and technology transfer in the shape of innovation support and advisory services, the support of market-oriented innovation infrastructure and a risk capital fund (i.e., financial instrument) for innovative SMEs.

The priority axis and priorities were divided into several funding subprogrammes, each having their own maximum budgets and rules and regulations. Examples include programmes dedicated to investments in medical devices, transfer vouchers, or research infrastructure programmes dedicated to universities of applied sciences. The programmes were open throughout the programme period and accepted applications until the budget was emptied. The Investment Bank of (Investitionsbank) Sachsen-Anhalt is the administrative MA of various ERDF-funded programmes.

The interview confirmed that the programme focusing on innovation project support (R&D -Research and Development) is the most important to analyse the ERDF contribution to the chemical sector. This programme formulated the Leitmärkte as a specific precondition. Many of these projects took place in close cooperation between SMEs - and often with Fraunhofer institutes. To quote 'Large companies would not even be considerable eligible for application'.

The shared data show that the Leitmarkt Chemistry and Bioeconomy generated a total funding volume of almost € 32 million and a total project volume of a little less than € 48 million - corresponding to 72 approved projects in the sector and 119 successful applications. It needs to be taken into account that each project partner submits proposals individually, explaining the quantitative difference between projects and

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<sup>7</sup> Energy, mechanical and plant engineering and resource efficiency, for instance, link directly to biofuels as well as the hydrogen economy. The link with health and medicine is also evident, as the pharmaceutical industry closely intertwines with the chemical sector. In relation to mobility and logistics, there is a close link due to the inclusion of biofuels in the strategy. Bioeconomy and nutrition and agriculture links to the (chemical) use of biomass in its specialization.

applications. It is the second largest 'Leitmarkt' in project volume, the amount of projects as well as the funding volume after 'Energy, mechanical and plant engineering and resource efficiency' (with a funding volume of € 54 million, and a project volume of € 91 million, corresponding to 252 successful applications and 159 approved projects). Health and medicine follow with a funding volume of € 24 million and almost € 35 million in project volume (corresponding to 89 successful applications and 49 approved projects).

Therefore, it can be concluded that the funds of the previous programme period strongly contributed to the chemical sector. The potential effects could have even been larger, if the other programmes that are part of the first priority axis would have been taken into account as nothing precludes chemical companies from utilizing the risk capital fund or innovation advisory services. The pandemic did not prove to be a reason to adjust the programme and the interviewee confirmed that there was no impact on the contents of the 2014-2020 programming.

There is no significant change in funding volumes in 2021-2027 in comparison to the previous programme period. The OP 2021-2027 underlines the successes of the interventions of the previous programme period and it can be generally established that the programme builds upon the fundamentals of the previous programme period. The selected specific aims under the new general European policy objectives largely correspond to the investment priorities of the previous programme period. At the time of writing, the OP 2021-2027 as well as the RIS3 are still in the final stages of approval. It is expected that applications will be possible at the end of the third towards the beginning of the fourth quarter of 2022. The interviewee confirmed that the pandemic and the required REACT-EU programming slowed down the programming process for 2021-2027, but that it did not necessarily impact the contents of the programme.

A relatively small reduction is observable in EU-funding (excluding technical assistance) in comparison to the previous programme period (€ 1,37 billion in comparison to € 1.27 billion). Yet, the significant REACT-EU contribution in the meantime should not be neglected. An important addition to the set of financial instruments is the CO<sub>2</sub>-fund of € 50 million, dedicated to sustainable investments of a broad target group (including companies and public institutions).

In relation to 'a more competitive and smarter Europe', the OP aims at supporting three thematic aims. The first thematic aim subsumes the previous two investment priorities of the first axis. The second and third thematic aim are largely in line with the previous second priority axis, with similar measures. The ERDF financial contribution corresponds to more than € 424 million for the first thematic aim, in comparison to the previously committed € 530 million. In addition, a reduction can be observed with regard to the second priority axis (second and third thematic aim) from € 358 million to € 235 million. An important change is observable in relation to investments in the broader topic of energy. In the 2021-2027 programme, more than € 300 million is made available to support the energy transition (under 'a greener Europe', thematic aims 2.1 and 2.3) in comparison to around € 210 million in the previous programme period (priority axis 3 excluding the mobility-related investments). An important addition is the new focus on intelligent energy systems, grids and storage systems. One of measures focuses on a mutual sectoral energy connection amongst industrial sectors to enable an efficient use of excess energy. Another measure focuses on investments in large-scale storage systems. This could present an opportunity to the chemical sector, due to the potential of hydrogen to store energy, the close cooperation between the chemical parks and the expertise in energy sharing.

The first thematic aim, as confirmed by the interviewee, is the most crucial and entails the same opportunities as the first priority axis in the previous programme period. This also includes the previously mentioned innovation projects and, again, places the Leitmärkte at the centre. The interviewee draws attention to some practical changes, being that the innovation advisory and support services will be integrated into the R&D project support programme. These two programmes / measures were both part of the same priority axis and investment priority in the previous programme period. Therefore, it is to be seen how concrete changes will unfold in practice.

With its sectoral focus and proven track record in financially supporting projects specifically dedicated to the chemical sector, the programme period 2014-2020 proved its importance. It is likely that ERDF 2021-2027 will deliver similar results, as the formal 'Leitmärkte' remain intact. Moreover, the broadened specific aims in relation to energy might open opportunities for the chemical sector in Saxony-Anhalt. It also needs to be considered that a larger industrial area comprised of parts of Saxony-Anhalt and Saxony, is selected as one of the three JTF-areas of Germany. At the time of writing, not much is known about the JTF setup of this area. Considering the general aims of JTF, it can be expected that it will lead to investments in SMEs, CO<sub>2</sub> reduction, energy efficiency and human capital.

#### **7.4. The regions responses and the selections of crisis instruments: REACT-EU and the chemical sector**

In this section, we will detail the impact of REACT-EU on the chemical sector. As in many other regions, REACT-EU was considered an important instrument to counter the effects of the pandemic. REACT-EU translated to a financial impulse of a little less than € 76 million (excluding technical assistance). The choice was made to focus on three specific objectives, each containing specific measures. The first specific objective focuses on investment support for businesses and research and development, the second focuses on energy efficiency in companies and the third focuses on digitalisation of companies and schools. Many of these measures were already intact, meaning that REACT-EU mainly provided a top-up. The first specific aim provided a top-up to the existing innovation project support programme and allowed for a continuation (with 'identical' conditions, as the OP 2014-2020 states).

In total, 62 proposals were submitted under the continued R & D project support programme. 38 proposals were approved, translating to 21 projects in total. Seven proposals were approved in the chemical sector, translating to four projects, with a total EU-contribution of around € 1,4 million and a total project volume of € 1,9 million. Energy, mechanical and plant engineering and resource efficiency remains the most dominant 'Leitmarkt' in terms of project volume (€ 5,7 million), EU-contribution (€ 3,5 million), approved proposals (25) and the total number of projects (12). A striking observation is that the two are relatively close in average project volume per project (a little more than € 470.000) but differ in average funding contribution. The projects within the chemical sector have a higher average funding contribution of € 340.000 in comparison to € 290.000 in energy, mechanical and plant engineering and resource efficiency. Other Leitmärkte and key enabling technologies range from 0 to 2 approved proposals and projects. The interviewee adds that the impact of REACT-EU on the chemical sector should not be overestimated and considered to be an 'add-on' or rather a small impulse. The approved projects are explicitly linked to the chemical sector.

## 7.5. Stakeholder involvement

According to the interviewee, there is a clear and systemic sectoral involvement in the preparation of the Operational Programmes and RIS3-documents. The interviewee mentioned that there used to be a network that operated as an interface between the chemical sector and the Ministry of Finances of Saxony-Anhalt. There is an intention to launch a similar network again.

- **ERDF 2014-2020 (OP and RIS3):** The OP was developed under the leadership of the Ministry of Finance of the State of Saxony-Anhalt. The contents of the OP were structured in close partnership between the state government, the parties represented in the state parliament, municipal / regional authorities and other economic, social and environmental partners. These partners were already represented in the monitoring committee. Moreover, the 'economic, social and environmental partners' founded an advisory board. The intermediate concept versions and structures were shared and allowed partners to comment in different settings back and forth (in the shape of online consultations and dialogue events). The central instrument of the partnership is the monitoring committee, which informs the partners in detail on the programme progress per quarter. The OP does not detail which partners are part of this monitoring committee or the advisory board. Yet, the interviewee confirms that it is probable that representatives of the chemical sector were members of the advisory board. In relation to the RIS3, experts were intensively involved. For instance, in the underlying economic study, during individual interviews, roundtable meetings and various other open consultations. Various partners would also get involved in the implementation, such as in the shape of a cluster- and innovation council (comprised of experts), responsible for strategically guiding the RIS (commitment, project advice, etc.), the Leitmarkt-guided working groups (expert advice and monitoring of Leitmarkt-specific aims, etc.) and clusters and networks (offering market knowledge, initiating and supervising projects, etc.). The interviewee confirmed that especially the working groups allowed for a sectoral representation, including the chemical sector, and added that they played a large role at the beginning of the programming period and in the interim evaluations. These evaluations effectively led to adjustments to the programme (higher funding volume, including organisational innovations as innovations in the R & D project programme).
- **REACT-EU:** The interviewee confirmed that there were limited consultations in the course of the REACT-EU programming. This largely had to do with the fact that the funding was *mainly* dedicated to already established measures as a top-up.
- **ERDF 2021-2027 (OP and RIS3):** The consultation and cooperation structures were largely similar to the previous programme period. The consultation procedures in the course of the development of the document were not detailed in the RIS3. However, the Leitmarkt-guided working groups were described as a 'crucial instrument' to implement the RIS3.

### Main conclusions:

- Saxony-Anhalt encompasses the entire chemical value chain. Aside from a few large companies and corporations, the landscape is characterized by SMEs. The regional chemical sector clusters in five prominent chemical parks being Leuna, Bitterfeld-Wolfen, Piesteritz, Schkopau and Zeitz. The chemical parks have a strong pull factor due to the numerous available services to companies and closely cooperate amongst each other in material cycles.
- The pandemic had limited effects on the contents of the RIS3 and the OP of 2021-2027.
- Considering its focus on 'Leitmärkte' and its proven track record in supporting sector-specific projects - it can be established that the programme period 2014-2020 provided a boost to the sector. It is likely that ERDF 2021-2027 will deliver similar results, as the formal 'Leitmärkte' remain intact. Moreover, the broadened specific aims in relation to energy (smart distribution and storage) might open up more opportunities to the chemical sector in Saxony-Anhalt.
- In relation to the involvement of stakeholders in developing the programmes and specific calls, it can be concluded that there was room to have a say (except for REACT-EU). In relation to the RIS3, there is dedicated room for input for the chemical sector in the shape of Leitmarkt-guided working groups. This primarily translates to influence on the execution of the RIS3.



## 8. The regional state of play: Wallonia (BE)



**Inhabitants:** 3.6 million (Statbel, 2021)

**Regional GDP per capita:** € 27.200 (Statbel, 2021)

**Added value / share of national added value:** € 106,4 billion, 23% the national added value (Statbel, 2021)

The Walloon Region, or Wallonia, is one of the three regions in Belgium. The Walloon Region consists of five provinces: Hainaut, Walloon Brabant, Liège, Namur, and Luxembourg, representing 31.8% of the Belgian population in 2019. The entire Walloon Region is French speaking, except for the German Community in the East of Wallonia, comprising 77.949 inhabitants.

### 8.1. Chemical sector in Belgium

In 2020, the Belgian chemicals, plastics and life sciences industry consisted of more than 720 companies with 95,500 direct and 220,000 indirect jobs and a €61 billion turnover. Additionally, with a research and development (R&D) investment of €5.6 billion, the sector accounts for two thirds of all private investment. This makes it one of the most important industries in Belgium and number one sector for export and innovation.

Essenscia is the sector-federation of the chemical and life sciences industry. Essenscia shares their expertise with companies on sector-specific topics within the chemical and life sciences industry. They also act as spokesperson and represent the interests of the sector on political levels and in the media.

### 8.2. Regional chemical sector: Wallonia

The chemical industry in Wallonia accounts for a quarter of the industrial turnover and more than a quarter of added value. Moreover, it is the leading export sector in Wallonia. The sector represents 48% of total Walloon exports in 2020, worth € 23.2 billion of chemicals, plastics and life sciences.

The employment areas in the chemical industry in Wallonia can be divided into different provinces. The basic chemicals are mainly located in the province of Hainaut, whereas the pharmaceutical industry is mainly located in the province of Walloon Brabant. Combined, these two provinces stand for 70% of the sector's activities and for more than 73% of the total employment in the sector.

A unique feature of the chemical sector of the Walloon Region, are the existing synergies between businesses and the university UCLouvain. Louvain-la-Neuve science park (LLN Science Park), which was created in 1971, is the first and largest science park in Wallonia with currently 271 companies, spread over 231 hectares. The companies located at the science park are intertwined with the university and their research. The companies are able to access the university's "Louvain Innovation Network", an ecosystem with the goal to stay on top of innovation and develop new projects and partnerships between the

company and university. The specialization of the companies located at the LLN Science Park vary from chemistry to engineering and communication sciences.

The Seneffe Science Park (Certech), created by UCLouvain in 1996 together with the European Union and the Walloon Region, is a partner in R&D and offers services to businesses that are directly or indirectly involved in chemistry related activities and industries (UCLouvain, n.d.). Their expertise is:

- Intensified / Continuous Processes
- Micro / Meso Fluidic Technologies
- Chemical Recycling
- Chemistry & Industrial Processes Technological Platform (Certech, n.d.)

### **8.3. The impact of COVID-19 on the chemical sector**

The impact of COVID-19 on the chemical sector is noticeable in different ways. Firstly, during the COVID-19 pandemic, the Belgian federal authorities decided that the chemicals, plastics and life sciences sector is considered as crucial. The sector provides indispensable services to society and plays a role in the socio-economic functioning of the entire country. On that note, companies were able to continue their activities under the COVID-19 hygienic measures. With regards to pharmaceuticals and research to fight against the crisis, the labour even increased.

Secondly, during the interview it was mentioned that COVID-19 has had an influence on the chemical sector in terms of communication. Between the actors in the chemical sector, there was a lack of communication and networking.

Thirdly, another impact of the COVID-19 crisis on the chemical sector that came up during the interview and needs to be taken account is the circular strategy. During the crisis, circular materials have become less competitive as before the crisis. Nevertheless, shortly after, due to the crisis the demand for circular materials raised since it has become evident that circular plastics offer better solutions for the protection materials, e.g., mouth masks.

Overall, the COVID-19 crisis has not affected the chemical sector immensely. There was a small disturbance noticeable in the sector. However, due to the importance of the industry, activities resumed quickly and continued.

When looking at the expected long-term impact of the COVID-19 crisis, it has been brought up during the interview that the global value chain plays an important factor for the chemical sector as well as for other sectors. The chemical sector is a globalized sector along the value chain and therefore the weaknesses need to be defined in order to define the position in the global value chain.

### **8.4. RIS 2014-2020 and RIS 2021-2027: comparisons and COVID-19 impact**

In this part of the analysis, we will highlight important changes between the RIS 2014-2020 and the RIS 2021-2027. Additionally, we will point out the impact of COVID-19 in both programmes, and in what way both programmes contribute to supporting the chemical sector.

The centre point of the RIS 2014-2020 are the clustering policies. The clustering policies are divided into clusters and competitive clusters, aiming to stimulate the development of business niches in areas of regional specialization, based on innovation and collaboration. The clusters are developed in the early 2000's by the Walloon Region and play a significant role within the regional ecosystem and are considered as the main levers for development of an efficient regional ecosystem. Within the RIS 2014-2020, it is pointed out that the clusters are a dynamic process with continuous development.

In the RIS 2021-2027, the clusters remain a key player. However, the RIS3 takes on a new form. In comparison to the former RIS3, it will focus on several societal challenges and domains, a set of innovative activities responding to societal challenges and contributing to strengthen the Walloon economy, focusing more on responding to the demand and needs. It defines how the Walloon ecosystem will contribute to the societal challenges in the form of innovative solutions. The clusters are involved by acting as a coordinator in two or three domains. The main reason for this change is to foster cross-sectoral innovation and communication.

As mentioned in the interview, the chemical sector is not specifically mentioned as an individual domain but rather interwoven with other domains and therefore found in numerous innovation initiatives. In fact, 75% of the available ERDF budget of Wallonia for innovation, is destined for the five domains.

The RIS3 focuses on factors, which has been brought forward by the COVID-19 pandemic, such as resilience of the economy and industries, and sovereignty, meaning to support local production. These fundamental issues will be improved through innovative solutions to respond to new needs after the pandemic.

The societal challenges align with the Walloon priorities and political orientations. The societal challenges that the RIS 2021-2027 focuses on are:

1. Resource optimization
2. Energy transition
3. Climate and biodiversity crisis
4. Health and healthy eating for all
5. Inclusive society

The 5 domains, which will act as a compass are:

1. Circular materials
2. Innovations for stronger health
3. Innovations for agile and safe design and production
4. Sustainable energy systems and housing
5. Agri-food chains of the future and innovative environmental management

Furthermore, in the RIS 2021-2027, significant light is being shed on the regional strategies that complement the RIS 2021-2027. The goal is to create synergies between the RIS 2021-2027 and other Walloon regional strategies, such as "Get Up Wallonia", "Digital Wallonia" and "Circular Wallonia". The program "Get Up Wallonia" focuses on priorities for the post-Covid recovery, with having a direct connection to innovation policy.

For the new RIS3 program, more consideration will be given to changes that may take place that may subsequently have an impact. The crisis has shown that it is difficult to make long-term predictions, which is why there will be more reviews during implementation.

### **8.5. Region's response**

The REACT-EU program for Wallonia does not highlight the chemical sector itself. In fact, it highlights the priority to prepare for a green, digital, and resilient recovery of the economy by repairing the damage caused by the COVID-19 pandemic. The REACT-EU program was a national decision without involvement of the stakeholders. Since the chemical sector was not highly affected by the crisis, the funds were not designed specifically for the sector.

In addition to that, the REACT-EU program enabled trainings for people who have been affected by the COVID-19 crisis, in order to find jobs.

According to the interview, the RIS3 for the new period has been constructed based on consultations with the stakeholders of the chemical sector. From the beginning of drafting the RIS3, stakeholders have been involved. Within the scope of the stakeholders, it has been taken into account the importance of having a stakeholder group that covers the quadruple helix. The goal was to have more co-construction and transparency while drafting the new RIS3. In February 2020, an evaluation of the former RIS3 took place and in July 2020, a 3-day event called "the Innovation Camp" was organized with the quadruple-helix. The stakeholders were also involved in identifying the 5 domains and defining these domains through roadmaps.

### **8.6. ERDF-programmes 2014-2020 to 2021-2027**

In the interview, it was indicated that the ERDF 2021-2027 program does not differ much from the previous program. There have not been a lot of changes and thus the initial structure and the goals of the ERDF program remain the same. The COVID-19 crisis did not have an impact on the ERDF program, i.e., no new measures have been taken. The actions set out in the 2014-2020 program will be maintained and amplified while being aligned to the strategic objective. For the new ERDF program, the stakeholders have not been actively involved.

### Main conclusions:

- The COVID-19 crisis did not have a significant impact on the chemical sector. During the COVID-19 crisis, the chemical sector has been considered as crucial, meaning that companies were able to continue their activities.
- The programming of the new ERDF 2021-2027 program was not affected by the pandemic. The structure and objectives have remained the same as the previous ERDF program 2014-2020.
- The REACT-EU program targeted sectors that were most affected by the COVID-19 crisis. The chemical sector itself was not highly affected.
- The new RIS3 program is built around five domains. The clusters that were the focus of the RIS3 2014-2020, play a coordinating role around these five domains. The creation of these domains were established through active re-evaluation of the former RIS3, stakeholder consultations and events. The goal is to stimulate cooperation between regional clusters. Networking is an important element on which the region manages.
- The chemical sector is not a domain in itself but is part of numerous activities within the domains.

## 9. Conclusions

The objective of this analysis is to measure the impact of COVID-19 on ERDF financing dedicated to (innovation in) the chemical sector within the S3Chem regions: Asturias, Catalonia, Limburg, Lombardy, Mazovia, Saxony-Anhalt and Wallonia. The analysis specifically focuses on the ERDF programmes (including the RIS3) of 2014-2020 and 2021-2027 (as far as information is available on the latter programming period) and REACT-EU as a crisis response instrument and a kind of bridging budget between the two ERDF programmes.

The overarching conclusions based on all the preceding region-specific chapters will be presented in this chapter. Essentially, this chapter answers the two main questions that guided the analysis on the level of all regions.

The main questions of the analysis are:

- ***How did the pandemic affect regional-European funding for the chemical sector?***
- ***What kind of lessons can be learnt from it to make European funding more resilient?***

The main questions are answered by individually addressing the corresponding sub-questions.

### 9.1 How did the pandemic affect regional-European funding for the chemical sector?

#### **What was/is the impact of the COVID19 crisis on the chemical sector?**

The short-term impact of the COVID-19 crisis on the chemical sector was not striking. During this uncertain historical period, the chemical industry showed unexpected resilience in all of its sectors. Indeed, chemical products, being essential for most consumers' products, were at the heart of the global response to the pandemic, ensuring effective pharmaceutical products and medical devices to fight the COVID-19 disease, food, fuels, and other essential commodities. Most activities remained intact, and the interviews and desk research largely confirmed that the 'business as usual' in the chemical sector could carry on without major disruptions.

It can be concluded that the short-term economic impact remained limited. In some regions, it can be observed that businesses within the sector reoriented their activities to remain resilient. For instance, production processes were adjusted to shift the focus on demanded medical products in light of the pandemic.

While the limited economic impact is a positive conclusion, it should be interpreted with a grain of salt. Specifically, regions suggest that companies were more cautious in engaging in expansionary activities in relation to innovation and the enlargement of the customer base. This cautiousness could translate to adverse economic impacts that only become visible in a couple of years from now on.

#### **What has been implemented for your REACT-EU program under the ERDF programmes 2014-2020 in relation to the chemical sector?**

Every Member State or region implemented the crisis support program differently. Some Member States mainly targeted the improvement of general and public services or used the program to support healthcare in the fight against the pandemic. In these cases, the chemical sector did not directly benefit from the REACT-EU programme. Other Member States or regions used it as a top-up for the ERDF 2014-2020 in order to enable continuation. In these cases, the chemical sector as such did not receive any special or more intensive support in comparison to other sectors or focus areas. However, the answer to the previous sub-question suggests that there was no urgent need for strong support as the sector was limitedly affected by the crisis.

**How have choices been made? How has the decision-making process been affected by the COVID-19 crisis?**

The COVID-19 crisis did not have a major impact on the content of the RIS3 and OPs for the period 2021-2027. This is not necessarily surprising: the programming period covers a long period of seven years while the pandemic is a relatively recent / situational incident.

Some regions acknowledge that COVID-19 functioned as a 'wake-up call' and drew attention to the importance of societal transitions, dependencies, and the economic sensitivity to crises of various kinds. Therefore, the pandemic had a more indirect influence by sharpening the perspective. It highlighted the importance of certain elements and topics that were already in the picture (stronger prioritization) instead of adding aspects. While the contents of the programme remained largely unaffected, the pandemic delayed the programming, and inevitably, the launch of the OP 2021-2027. Some regions attributed this delay to the preceding opportunity to program REACT-EU.

**How did stakeholders participate in the decision-making process regarding regional EU funding in order to counter the impact of the COVID-19 crisis in the chemical sector?**

To clarify: this question refers to the REACT-EU programming. In the regions with a regionally programmed REACT-EU, stakeholders did not specifically participate for two main reasons. First, the urgency to program REACT-EU translated to a short time frame and complicated stakeholder involvement. Second, REACT-EU mainly served as a top-up to existing funding structures, decreasing the necessity. This question is not applicable to the south European S3Chem regions due to the national, central programming of REACT-EU.

**How are the stakeholders involved in the drafting process of the RIS3 and the programming of ERDF 2021-2027?**

Stakeholder involvement is an important prerequisite for the drafting process of the RIS3, as well as the ERDF programming process. This means that each S3Chem region involved stakeholders, albeit in different ways. At the time of this analysis, some regions are still in consultation with the stakeholders whereas others already completed the consultations. The regions that already completed the consultations emphasize the involvement of all important regional actors. As the chemical sector is of importance to these regions, this automatically translates to the involvement of the chemical sector amongst other sectors / actors that are similarly important to the regional economy. In other words, the chemical sector was an important stakeholder in the drafting process of the RIS3 and in the programming of ERDF 2021-2027 - but did not have an exclusive role.

**What are the short-term adjustments as a result of the COVID-19 crisis to the ERDF programming 2014-2020? What are the main observable changes, in comparison to the original programming in 2014-2020?**

In general terms, the regions can be grouped in relation to their responses. Some regions had already dedicated the largest part of the 2014-2020 funding to specific projects before the pandemic began or had high-demand funding programmes with a short-term perspective of investing the full funding amount into projects. In other words, there was limited room for crisis-related adjustments in these regions. However, the crisis proved to be a reason to adjust the 2014-2020 programme to the regions with remaining 2014-2020 funding. These regions would redirect the funding to, for instance, medical products and equipment.

## 9.2 What kind of lessons can be learnt from it to make European funding more resilient?

### *What role will the chemical sector play in achieving a green, smart, inclusive and resilient economy?*

On the one hand, the chemical sector is known as one of the most polluting sectors, increasing the urgency to take action. On the other hand, the interwoven and cross-sectoral character of the chemical sector allows it to contribute to a more sustainable society and industry. For instance, the chemical sector plays a crucial role in the hydrogen and biobased economy. The programme documents of 2021-2027 in nearly all regions clearly demonstrate that the awareness for sustainability in the chemical sector grows (e.g., circularity and green chemistry). Some regions even take the step to include the contribution to societal transitions in general as a precondition for funded projects.

### *What are the stakeholders' expectations on the future of EU funding for the chemical sector?*

At this stage, there is not much clarity on the opportunity structure for the chemical sector in the future EU funding landscape and stakeholders were generally not able to provide examples or an estimate. This could largely be attributed to the fact that many programme documents have not been formally approved yet during this study.

For the future, the ERDF is not the only EU funding source to keep in mind when it comes to the chemical sector, or more broadly, the industrial transition. JTF could entail an impactful change of the opportunity structure as the programme is dedicated to the industrial transition specifically. In comparison, ERDF covers industry and the chemical sector as one of the many economic and societal topics. But only a few S3Chem regions are JTF-eligible (Asturias, Limburg, Saxony-Anhalt and Wallonia).

### *What are the good practices?*

The good practices are addressed in-depth in 10.

It needs to be taken into account that the seven regions are unique with regional chemical sectors that differ in structure and specialization areas. Whether a way of working can be considered a good practice depends on the unique regional economic profiles and is therefore subjective. To name an example: regions where the chemical sector comprises an exceptionally large and influential part of the regional economy are more likely to consider the specific stimulation of the chemical sector through project criteria as a fitting good practice.

This study shows that there are two types of good practices. There are good practices that are based on the manner of ERDF programming, and good practices that are based on approved projects. Exception is Wallonia's good practice, which is based on its general approach of supporting its chemical sector, as well as part of the Lombardian good practice, which is based on general support of the chemical sector.



## 10. Collected good practices

The below presented good practices have been provided by the regions during the interviews. The provided good practices differ amongst each other and range from unique approaches to ERDF programming to ensure consistent support to the chemical sector - to distinctive project structures that support crisis recovery (and specifically the target groups most affected by it).

### 10.1. Asturias

#### Public-private cooperation

Asturias launched during the first wave of the pandemic financial arrangements to support regional enterprises. These instruments may not have been a unique arrangement, financial support was made possible in many regions and Member States, but it was an effective means of supporting the regional economy during the pandemic:

- IDEPA and ASTURGAR launched two guarantee programmes to enable companies to meet their operating costs. In 2020, 121 guarantees were granted for an amount of 4.4 million euros.
- Moreover, IDEPA activated the work of certifying and paying subsidies so that companies could have a healthier cash flow. It also extended the deadlines for the execution of those projects that expired during the pandemic to give companies more time to carry them out.
- In addition, a whole series of measures were developed in the design of the calls for aid (reducing minimum eligible investment, including new eligible concepts, reinforcing investments in digitalisation), as well as services (telematic skills, online marketing, social networks).
- Finally, ASTUREX subsidised the use of support services and programmes abroad and offered the services of its foreign network to facilitate the search for alternative suppliers that would allow companies with greater dependence on Chinese-made components in their production processes.

## 10.2. Catalonia

### The Virtual Marketplace

According to the interview, a good practice of Catalonia is the **Marketplace**. In order to facilitate businesses to ease the impact of the COVID-19 crisis, ACCIÓ, supported by the government, has set up a *virtual marketplace*. The focus of this virtual marketplace are technology services and healthcare products. An important component of the marketplace is the short-term approach. The offered services and products need to be effective short-term.

The goal is to connect companies, manufacturers or other businesses and boost collaboration by offering services and materials to each other. The Marketplace mainly offers technology or material that is health-related. Next to that, the marketplace also offers services as in production capacity.

More than 2,000 companies are involved in this marketplace. The marketplace was available for one year.

The reason that the Marketplace is considered to be a good practice is because it can be applied in other regions too. It promotes cooperation to find short-term solutions effectively, using own capacities. Additionally, Catalonia has proactively supported the region with the Marketplace.

### 10.3. Limburg

#### 'Limburg Recovers and Speeds Up (2021-2023)

The aim of this ReactEU project is to lead SMEs in Limburg out of the crisis, to strengthen their competitiveness and prepare them for an international future. The project is led by the relevant regional development agency in Limburg, LIOF. The main approach is to stimulate innovation and create a hands-on and financial support structure.

On the one hand, the project allows for knowledge sharing on new technologies and market opportunities via events, masterclasses, cooperation projects and individual support of business developers. In addition, entrepreneurs can obtain support and advice to expand their activities to international markets.

On the other hand, LIOF can support SMEs *financially* with two dedicated programmes:

- **'Limburg Future Proof:** This programme focuses on innovations that contribute to economic and societal benefits. The programme contains multiple specific financial instruments. These financial instruments can also benefit companies that are active in the chemical sector.
  - **CollectiefProject** focuses on collective or individual SMEs by providing a contribution of a maximum of 75% of the total costs, up to a maximum of € 7.500 to hire an expert (from a regional company or knowledge institute) to jointly explore opportunities to develop new products / projects.
  - **AdviesProject** focuses on individual SMEs by providing a contribution of a maximum of 50% of the total costs, up to a maximum of € 7.500 to hire an expert to research the technical or economic feasibility of an innovative product or process
  - **InnovatieProject:** focuses on individual SMEs by providing a contribution of a maximum of 35% of the total costs, up to a maximum of € 50.000 to support in the development of a functional prototype – with room for different types of costs

## 10.4. Lombardy

### Re-allocation of funds and a platform for the Green Chemistry

Regarding the impact of COVID-19 on the Lombardian ERDF programme 2014-2020, the budget has not been used entirely. Funding has been used for crisis measures and purchase of medical products. This means that there was a higher spending of ERDF, but the expenditures were focused on new themes as this was allowed by the European Commission.

In Lombardy, an association was founded in 2013 to support green chemistry: Lombardy Green Chemistry Association. The association assists companies and research institutions in green chemistry and kept in close contact with its members during the pandemic to cover the impact of the pandemic on the often still young companies. As a result, a platform for exchange of knowledge and information was also available during the first wave of the pandemic.

## 10.5. Mazovia

### Making Investment Money available for SMEs

In order to avoid a slowdown of investments in the region, the Mazovian regional authority used the unspent funds from the ERDF programme for the CRII+ initiative to make investment money available to SMEs in the form of financial instruments. The extension of support to include working capital expenditures the ERDF/CRII+ programme helped SME's to respond in a positive manner to the Covid19-crisis. Particularly, it helped SMEs in the ongoing settlement of liabilities, maintaining financial liquidity and employment. Despite the availability of liquidity loans, interest in investment loans continued at the same time. Therefore, the Covid-19 crisis has not had a significant impact on investment in the industry. The investments were implemented in accordance with the assumed development and operational plans.

## 10.6. Saxony-Anhalt

### Consistent sector-based programming

The region-specific chapter demonstrates that ERDF strongly contributed to the chemical sector in the programme period 2014-2020 and that ReactEU provided a small impulse. Saxony-Anhalt has developed for its ERDF programme a strategy that prioritizes specific sectors with clear regional strengths, based on so called 'Leitmärkte' (guiding sectors): energy, mechanical and plant engineering and resource efficiency, health, logistics, chemistry and bioeconomy, and nutrition and agriculture. The (in this case innovation and R&D oriented) ERDF funding is divided into smaller programmes. One of these programmes is dedicated to innovation projects and mainly supports SMEs (sometimes in cooperation with research institutes). To be able to participate in a project, applicants need to demonstrate a link to one of the mentioned sectors.

The results have proven the efficacy of the strategy when assessing the contribution to the chemical sector in the programme period 2014-2020. The shared data show that the Leitmarkt Chemistry and Bioeconomy generated a total EU funding volume of almost € 32 million, making it the second largest 'Leitmarkt' in the funding volume.

ReactEU was utilized as a top-up to enable the continuation of the R&D project programme, as a result of which the region continued stimulating R&D and innovation in an economically difficult time.

## 10.7. Wallonia

### Call for Strategic Structure Innovation Initiatives

With the objective of transforming its economy for the future and to support sustainable development, the Walloon government launched the call for Strategic Structure Innovation Initiatives (SSII). The call was based upon the European smart specialization lines, but no EU funding was involved.

SSII has the goal to mobilize the already existing Walloon clusters to connect and interact with each other to create new regional ecosystems by cross-collaboration, also with actors in other parts of Belgium and beyond.

At the end of this call, 20 industrial projects were selected, divided into 5 pillars: circular materials, innovations for improved health, agile and safe design and production methods, sustainable energy systems and habitats, and finally the agri-food chains of the future and innovative environmental management. Overall, the call is an expression of interest in building a regional framework relevant to innovation and industrial policies.

## 11. List of Interviewees

For the analysis of every region, an interview was held with a delegation per region. Below is a chronological overview of the regional representatives interviewed:

### **Lombardy (date: 6 April 2022):**

Dario Sciunnach (Region of Lombardy)

Manuela Sarah Ragusa (Region of Lombardy)

Paola Bardinella (Region of Lombardy)

Fabiana Gatto (Consorzio Italbiotec)

Ilaria Re (Consorzio Italbiotec)

### **Mazovia (date: 28 April 2022):**

Sylwia Sztark (Region of Mazovia)

Olga Michalska (Region of Mazovia)

Malgorzata Bialczak (Region of Mazovia)

Dorota Siedliska (Region of Mazovia)

Marcin Wajda (Region of Mazovia)

### **Limburg (date: 6 May 2022):**

Dirk Plees (Province of Limburg)

Harma Albering (Province of Limburg)

Pieter Liebrechts (Stimulus Programme Management)

### **Sachsen-Anhalt (date: 17 May 2022)**

André Mangelsdorf (Land Sachsen-Anhalt)

### **Catalonia (date: 24 May 2022):**

María Dolores Nuñez (Generalitat de Catalonia)

Paula Gallego (Generalitat de Catalonia)

### **Asturias (date: 31 May 2022):**

Paz Palacio Fernandez (Principado de Asturias)

Monica Díaz de la Peña (Principado de Asturias)

### **Wallonia (date: 7 July 2022):**

Fanny Herbecq (Region of Wallonia)

Vincent Lepage (Region of Wallonia)