



Ministry of Foreign Affairs

# *Circular Business Opportunities in Poland*

*Commissioned by the Netherlands Enterprise Agency*

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International.*



# Circular business opportunities in Poland

Prospects for Dutch entrepreneurs  
2021

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# Executive summary

## Polish favourable economic conditions

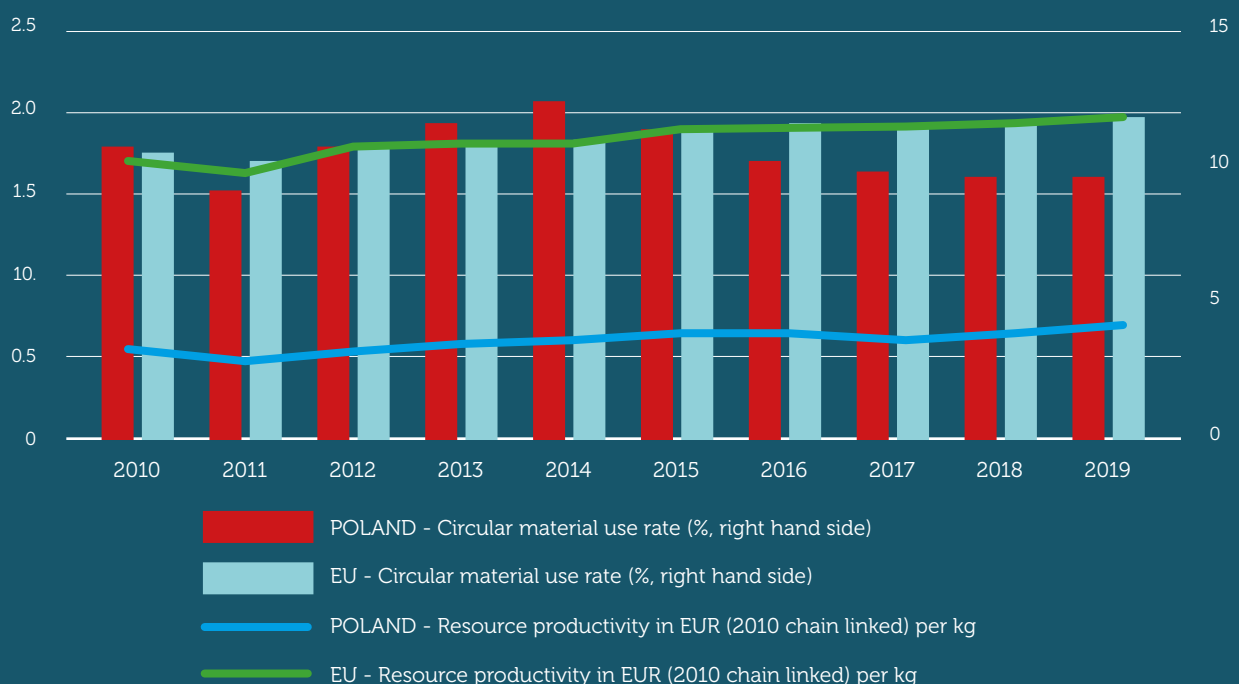
Exporters and entrepreneurs, Dutch as well, are drawn to Poland due to the country's large domestic market, well-educated and competitive workforce, strong prospects for economic growth and location in the centre of Europe.

## Push towards sustainability-oriented businesses

Current consumer behaviour, material supply issues and regulatory changes necessitate new investments to consider environmental and social factors. The basic concept for implementing such considerations and not losing profitability in the process is to adopt the circular economy model. The model's primary goal is value retention in result of closing economic loops.

## Lagging circular economy adoption in Poland

In the last decade, improvements in the efficiency of material use fuelled approximately half of the economic growth in Poland, the other half stemmed from growing material consumption, while EU's economic growth was not based on material consumption increase at all. Additionally certain indicators, such as the percentage of circular materials use rate, indicate the gap between the European leaders has widened considerably in the last decade.



## Momentum for circular transition in Poland is already visible

The bleak picture, painted by macroeconomic circularity indicators does not tell the whole story. There are more and more circular initiatives, ranging from grass-root projects to governmental actions. Commercial companies, both small and medium ones, as well as global corporations operating on the Polish market are eager to implement circular economic models in their products and services.

## Covid-19 pandemic has highlighted the feasibility of circular economy also in Poland

During the pandemic, people in Poland and around the world started limiting their consumption, decreasing transportation, adjusting their dietary habits, etc. These actions provide evidence on our previous excessive usage of earth's valuable resources and the overcapacity of our assets. Circular economy could help to keep the decreased pressure on our planet's resources beyond time of the pandemic. Closing the loops, especially on the local level, should provide the supply chains with appropriate flexibility and self-sufficiency on the regional scale, also preparing our economy for future crises, which makes the benefits of circularity even more compelling.

## A number of drivers support the process of circular transition in Poland

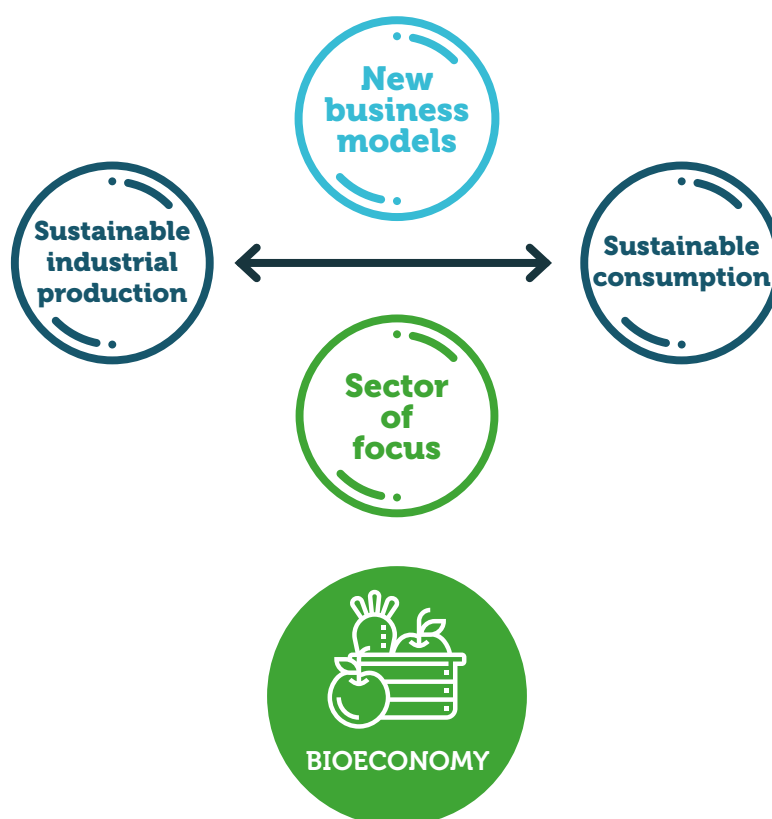
Existing and prospective regulations, especially on the EU level, push the implementation of the circular economic model. Consumer demand is gradually shifting towards more sustainable products and services. There is a growing number of initiatives that aim to educate, train, inform and transfer knowledge on the circular economic model. Resource use reduction was and still is, one of the main objectives of Polish businesses. Grants, subsidies, loans and other public financial incentives for circular business activities are available on the EU and national level. These concern EU funds in particular, as Poland will be one of the largest beneficiaries of the EU 2021-2027 financial framework as well as the EU's Reconstruction Fund.

### Recovery and Resilience Facility



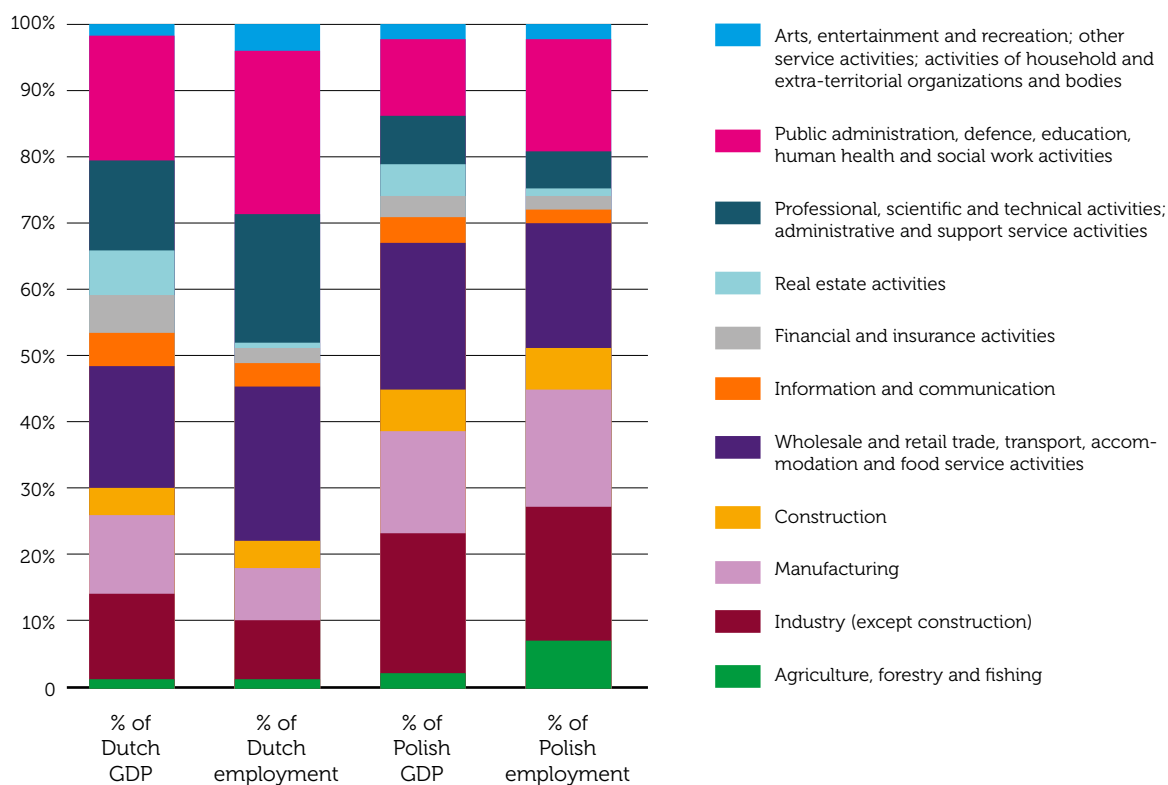
## Polish legal framework for circularity is insufficient

There is relatively little interest of Polish regulators to implement schemes and programmes, beyond those proposed on the EU level. The general, cross-sectoral strategies and specific targets and goals are still lacking. There are few examples of such actions, with the most notable one being Roadmap for the transformation towards a circular economy. The roadmap prioritizes innovativeness and cooperation between industry and academia, providing high-quality secondary raw materials as a result of sustainable production and consumption, as well as facilitating those markets and the service sector. In order to implement the above-mentioned priorities, the roadmap distinguishes measures in the following areas:



## Relative differences of Polish and Dutch economies could be harnessed to attain a competitive advantage for circular endeavours

The Dutch economy is more service-oriented, while the Polish one is still dependant on its historical heritage, with a decisively higher importance of industry, agriculture and manufacturing, especially in terms of employment. These relative differences can be put to use, by facilitating trade and fuelling cooperation between the two economies. The circular model implementation could further enhance cooperation and result in finding synergies between the two economies and by complementing each other. Especially, that Dutch economic activities as well as developed technologies match the Polish resources supply in the sectors prioritized by the Dutch government.



## Availability of production factors ensures relatively simple replicability of Dutch circular business models

Dutch companies may use their expertise and experience to easily replicate business models and technology implementation in Polish conditions. The easily available production factors may facilitate this process. To some degree, those businesses could cater to the expectations of environmentally-aware Poles and businesses that are eager to decrease their resource use. They could also make use of Poland's favourable location for export activities. As a first-mover, such companies could gain competitive advantage, as companies already present on the market have not yet realized the possible economic benefits of either implementing the circular economy model or cooperating with academia. They could also be on an advantageous position in applying for a sizeable chunk of the EU 2021-2027 funds.

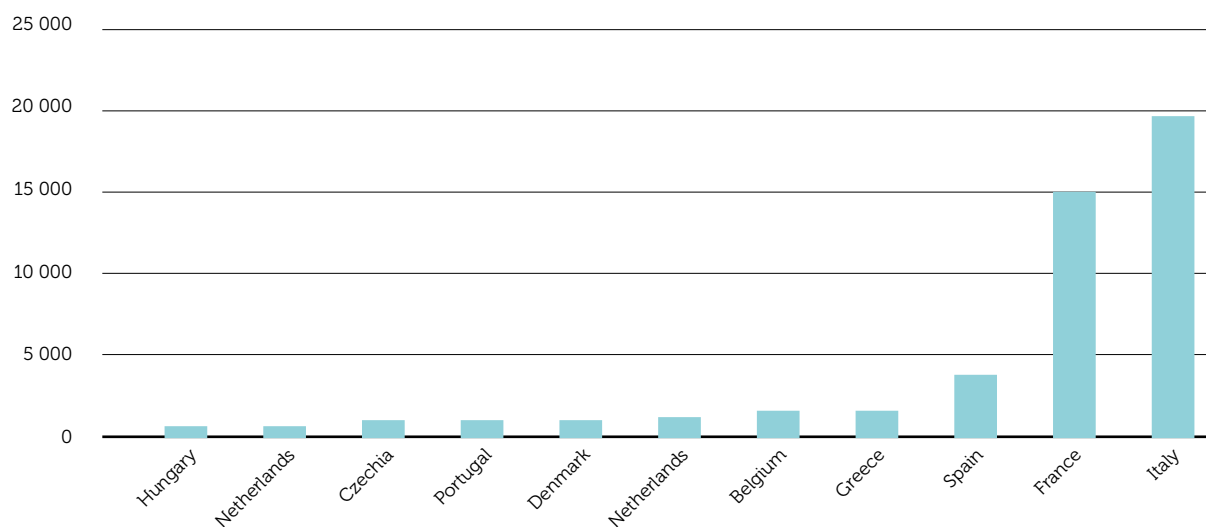
## Bioeconomy, energy sector and built environment are areas with the most potential for circular business development in Poland

### Bioeconomy

#### Poland – Europe's future food production and processing hub

Poland has the fourth-largest area of arable land in the European Union. Furthermore, a sizeable portion of the country is less industrialized, which could be a terrific starting point for production of eco-friendly and organic foods, possibly with the aim of exporting it to environmentally-aware Western European consumers. The highest potential concern poultry, horticulture and milk production.

Number of processors of organic products in chosen countries in 2019 (or latest available data)



### **Sustainable biogas production could follow agricultural development**

With a considerable size of the arable land and feedstock in Poland, coupled with the country being a net energy importer, thriving biogas sector based on agricultural waste could be a possible route for assuring appropriate energy mix in the country.

### **Sustainable soil management, including organic fertilization is needed**

In Poland, there is a considerable unmet need for a more sustainable agricultural production through soil management, including organic fertilisation. This process is carried out only by large farms ran by well-educated farmers, mostly in the western parts of Poland, while broader application still awaits.

### **Cooperation and consulting for a more sustainable farming**

Due to a high fragmentation of farms in Poland there is a huge untapped potential for companies that seek synergies through cooperation. Poland's agriculture and food industries are skewed toward low value-added produce. To process produce additional infrastructure is needed. Cooperation on improving quality, scaling supply for processing activities is possible thanks to vertical integration and clustering.

## **Energy**

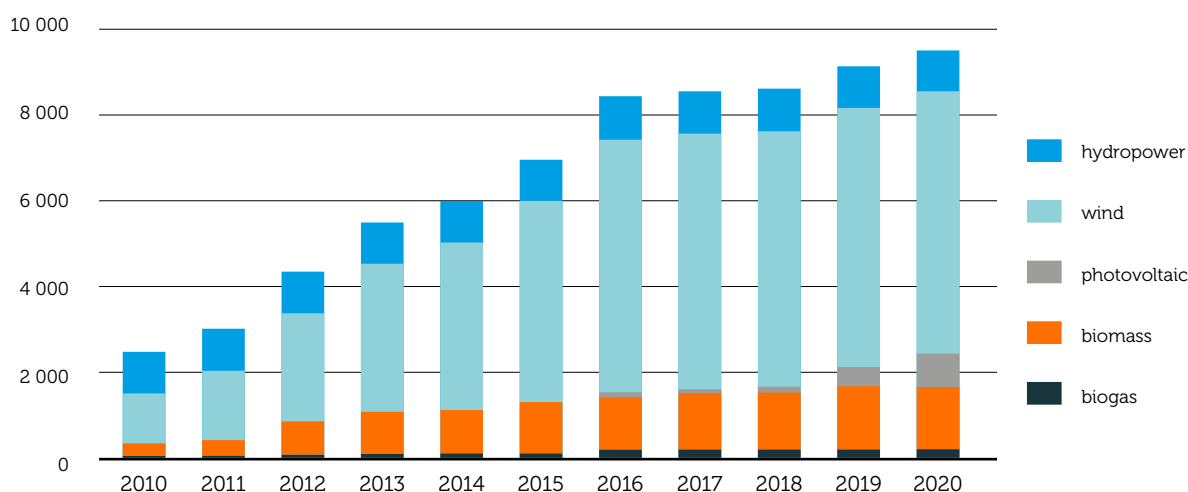
### **Rapid development of solar energy will continue**

Photovoltaics is one of the fastest growing segments of the renewable energy sector in Poland. The capacity of photovoltaic installations increased almost fivefold in just two years. This growth is expected to continue in the upcoming years. Dutch companies can enter the market, possibly using circular business models, e.g. product as a service.

## Wind energy is indispensable in Polish energy mix, especially offshore energy

In 2020 63,7% of all renewable energy in the country was produced using wind. Due to the need to improve Polish energy mix offshore wind production is still on the rise as the basic source of renewable energy in the country. Currently onshore wind generation capacity development is somewhat restricted, but there are plans to revise parts of the bill that hindered onshore wind energy development.

Installed renewable energy power in Poland (MW).



## Energy distribution and storage is in need of expansion and renovation

Investments undertaken by distribution system operators for distribution grid expansion, upgrade, automation and cyber-security are substantial. These market areas could be accessed by Dutch companies, which are one of the leaders in renewable energy technologies in Europe. Value chain benefits are also present.

## Built environment

### From a European leader in furniture production to a circular furniture frontrunner

There is a number of advantages that resulted in Poland becoming one of the world's biggest furniture producers that could also be used for the development of circular furniture production. These are: relatively low production costs, including labor costs for highly-skilled employees, strong governmental support for the furniture industry and availability of various aid funds, the proximity to resources of both solid wood and wood-based materials. One untapped potential business route is to enter repair, refurbishment and remanufacture activities in upmarket furnishing. Beyond product design and manufacture, circular companies in the furniture sector may also innovate to reclaim the economic value of their waste.



**There is still a lot of untapped revitalizing potential**

The high priority of revitalization in the urban policy in Poland is included in a number of official public documents and is one of the governmental priorities. Such areas are drawing more and more interest from commercial companies that are willing to profit on their investment and at the same time build and operate according to circular concepts - using existing resources to the fullest and increasing social cohesion in the cities. Entrepreneurs may benefit from revitalization of some areas occupying whole city blocks, often in prime locations. Some of them are heritage properties of interest to affluent buyers.

**Circular innovation in construction is still negligible but imminent in the future**

Circular technologies in construction have not been applied or their implementation in Poland has just begun. The extensive building management system, extensive energy consumption metering, lighting sensors, the use of high-quality filters in ventilation systems, water-saving flushing systems, temporary batteries with flow limiters or aerators, leakage detection systems are just a few of the solutions that could be offered to the Polish consumer.

**Primary obstacles that have to be taken into account or mitigated when establishing circular businesses in Poland:****Regulatory obstacles**

- Complexity and instability of legal framework
- Policies based on linear models
- Lack of support for circular business models

**Lack of know-how**

- Lack of knowledge on circular economy and circular solutions
- Lack of technical skills

**Linear approach to day-to-day business**

- Limited internal and external cooperation
- Incorrect perception of the circular economy model and its benefits

**Focus on short term return and cost reduction****Lack of business environment for circular economy initiatives**

- Little support for circular value chains
- Reluctance to share information

**Insufficient customers' awareness****Barriers specific to foreign investors**

- Language barrier
- Lack of local network
- Limitations in international transactions or deliveries
- Difference in the acceptable level of price of the final product
- Linear approach to waste

## SWOT analysis on possible Dutch engagement in Poland in circular businesses

### Strengths

- Economic resilience and strong growth performance.
- Well-educated and competitive workforce (especially in ITC sector, which can facilitate virtualization and circular business models application).
- Substantial industrial capacity and arable land supply.
- Poland is one of the biggest beneficiaries of EU funds including the Reconstruction Fund; a considerable portion of those funds is used for circular transition.
- Incentives in the form of special economic zones and tax deductions, etc. are available.
- Poland has favourable location that enables an easy access to both East- and West-European markets; the country is a gateway to other countries in the region.
- Polish companies are eager to decrease their costs, this also concerns resource use reduction, which is in line with circular economy concept.
- Existing regulations, especially on the EU level, fuel transition towards circular economy.
- A number of NGO's and grass-root projects already started educating, informing and supporting consumers and policy-makers in a circular transition.

### Weaknesses

- Consumers typically prioritize short-term costs over long-term economic and environmental outcomes.
- Liquidity barriers disable customers from buying circular or sustainable product and services that offer better long-term value.
- Lack of trust between the seller and the buyer, as well as limited access to quality product information.
- Still limited market scope consisting of a narrow group of environmentally-aware consumers.
- Few green procurement examples; majority of the procedures based mainly on price.
- Poorly developed circular business environment and value chains.
- Lack of cross-sector cooperation between companies.
- Weak industry-science links and insufficient diffusion of knowledge at the national level.
- Inefficient commercial judiciary and bureaucratic red tape.

### Opportunities

- The process of gradually shifting Polish consumer demand and society awareness towards more sustainable products and services has already started; first movers may gain advantage.
- Growing regulatory requirements e.g. rising waste handling fees, may push both companies and consumers to turn to circular solutions.
- Competition has not yet realized the possible benefits of implementing innovative circular solutions.
- Small and medium enterprises are reluctant to innovate, thus a number of niches is still available.
- Already developed circular technologies can be easily implemented by replicating existing ones as there is little competition and circular businesses are only beginning to gain momentum.
- Connections between business and academia may offer a competitive advantage, as such cooperation is still negligible.
- Untapped potential for organisational changes towards circularity (industrial symbiosis, sharing economy, etc.).

### Threats

- Ad-hoc legislative changes and legal instability, concerning waste in particular.
- Differences in working environment between Poland and the Netherlands may cause complications in day-to-day operations.
- Circular economy could be understood as a PR or CSR stunt not as a genuinely profitable endeavour, which may limit the development of circular business environment
- Government's reluctance to reform some sectors (energy and farming in particular) may limit circular model application in those areas
- Government's political stance may be a source for concern for financing possibilities, especially from EU funds.

An abstract graphic featuring several thick, 3D-rendered ribbons in various colors (yellow, orange, red, green, blue, purple) that are intertwined and looped together. The ribbons have a slight gradient and shadow, giving them a three-dimensional appearance. They are set against a solid dark blue background. The word "CONTENT" is written in a bold, orange, sans-serif font to the right of the ribbons.

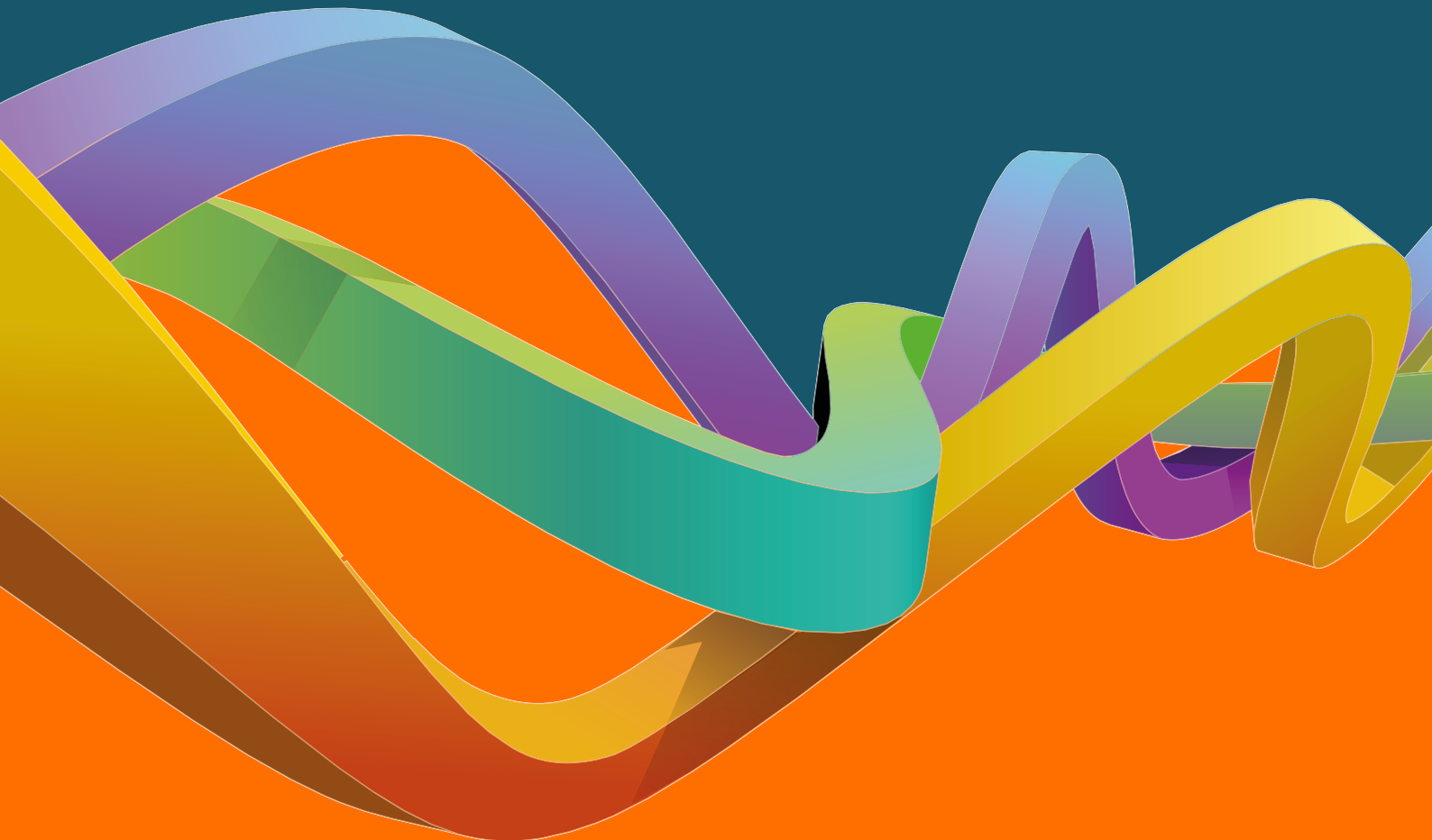
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# chapter 1



## Overview of circular economy in Poland

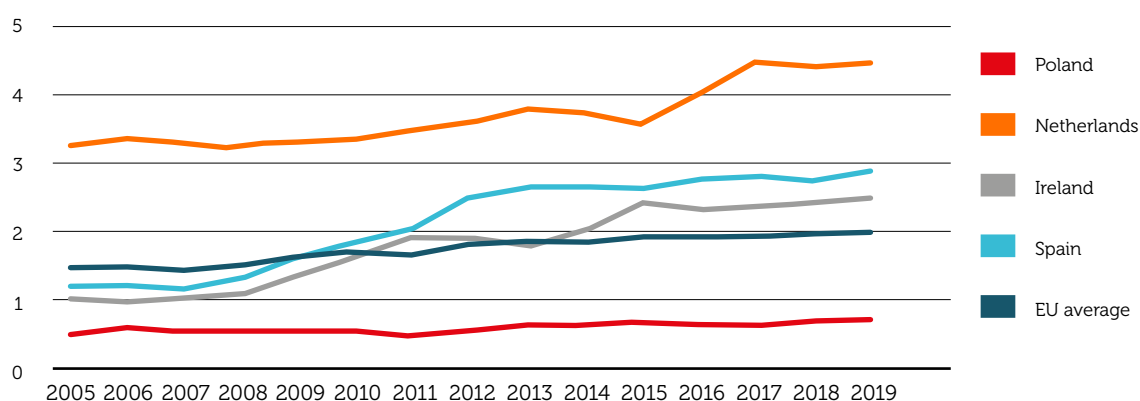


## 1.1 State of play

Poland is an important and dynamic market located in the heart of Central Europe. Exporters and investors, Dutch as well, are drawn to Poland due to the country's large population, well-educated and competitive workforce, strong prospects for economic growth and location in the centre of Europe. However circular economy model adoption has been lagging, despite growing awareness among Polish society.

Since the beginning of the XXI century, we have been observing a constant improvement in the productivity of raw materials in Poland. In the 2005-2019 period it has increased by 36,6% in real terms. However, it should be noted that Poland is not shortening the distance to the average for the entire European Union, whose material productivity in the same period rose by a comparable 35,5%. Furthermore the distance to EU countries with fastest productivity growth has widened considerably<sup>1</sup>. In 2019 the level of material productivity seen in the Netherlands - the EU leader was six times higher than in Poland.

Figure 1 Resource productivity and domestic material consumption (in EUR in real terms per kg of material)



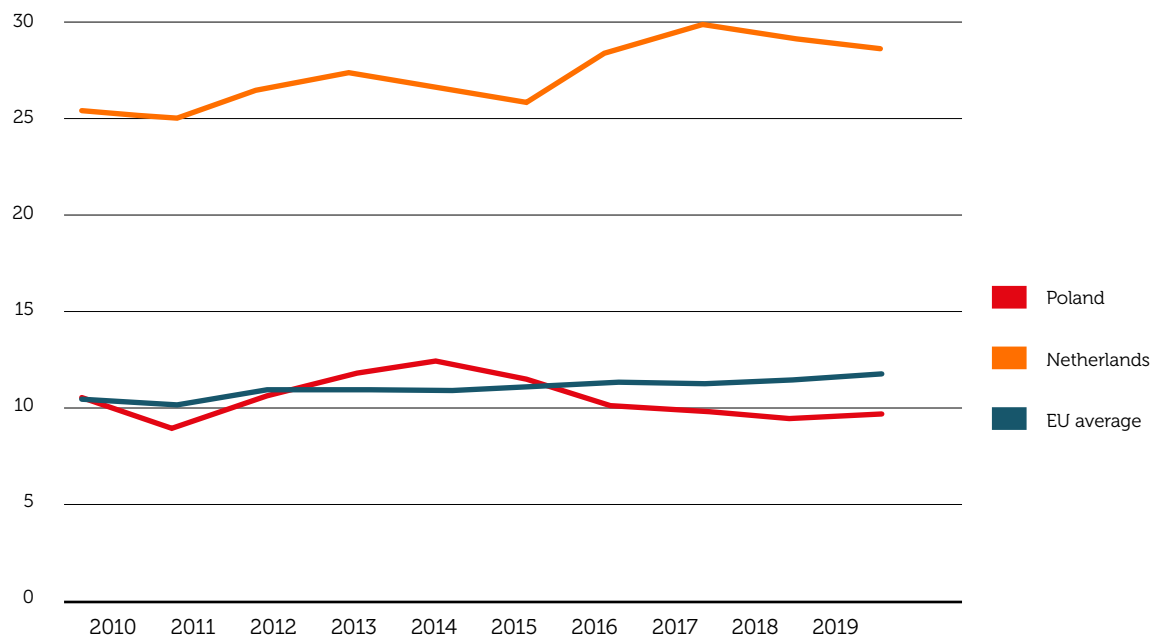
Source: Eurostat.

This picture should be assessed in even darker colours, considering that in the 2005-2019 period Poland's GDP, according to Eurostat, grew in real terms by 74.0%, while for the entire European Union this indicator amounted to only 19.9%. This means that the economic growth in Poland was to a large extent the result of an increase in the consumption of production factors - in this case materials. Improvement in the efficiency of material use, that can be seen as a gauge for circular model adoption, was responsible for less than half of the economic growth in the analysed period, while in the whole EU it was the sole contributor to the rise in GDP.

The implementation of circular concepts should result in minimizing the use of raw materials while achieving the highest possible returns on the material used - unfortunately this was not the case in Poland in the last 15 years. Certain indicators, such as the percentage of re-used materials, which until recently were above the EU average, have now deteriorated, while the gap between the leader in closing material loops - the Netherlands, has widened considerably.

1. In the 2005-2019 period material productivity in Ireland has grown by 146,1%, while in Spain this indicator reached 143,2%.

Figure 2 Circular material use rate (%)



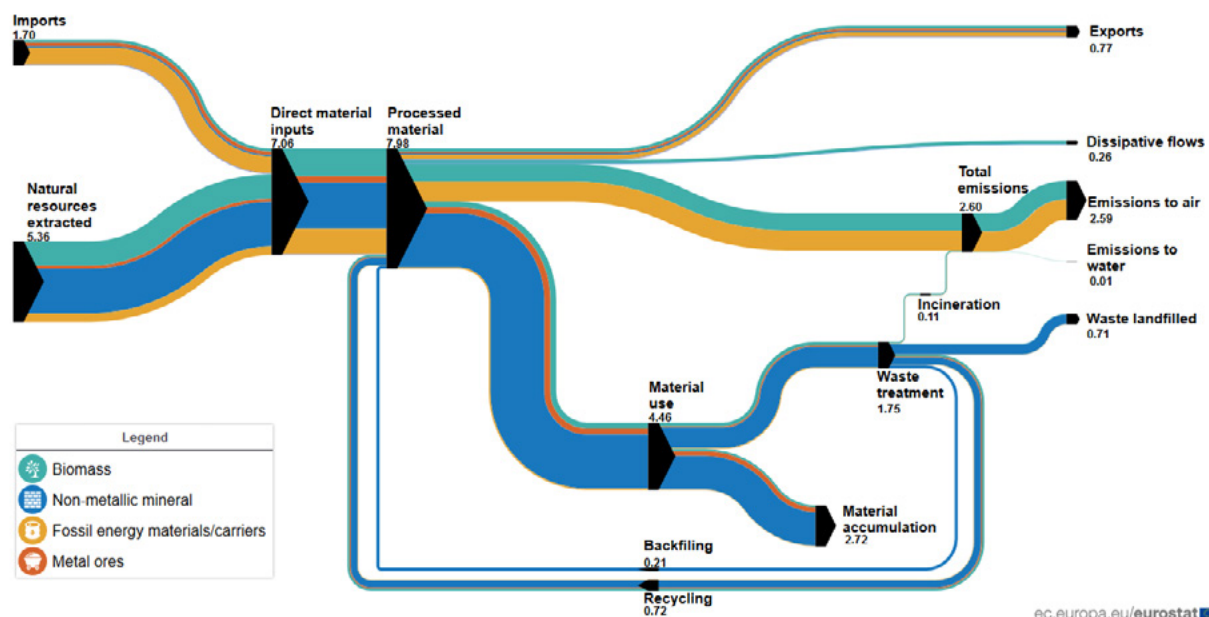
Source: Eurostat.

Material flow analysis corroborates the findings based on the aforementioned indicators. The Polish economy uses considerably more material resources than the EU average. In 2018 direct material inputs were equal to 22.3 tonnes per capita, compared to 15.9 tonnes in the whole EU. This means that the Polish economy uses approximately 40% more resources per capita in terms of mass. The difference is partially a consequence of higher usage of fossil energy material/carriers, though it is not limited to this factor. Consequently, total emissions to air and exports of processed materials per capita are higher than the EU average in absolute terms.

However, what is somewhat puzzling is the disproportionally high mass of materials accumulated in the economy. It may be a result of relatively low level of Poland's development, which in consequence requires higher accumulation of durable goods (mainly building and constructions), instead of their replacement. According to this interpretation a lower proportion of waste would be landfilled, which is indeed the case. Additionally, one would expect a lower proportion of recycled or backfilled materials than the EU average. It seems however that Poland recycles materials or uses them as backfilling to a greater extent, compared to other EU members (it concerns mostly construction materials, though according to some sources this data is questionable<sup>2</sup>).

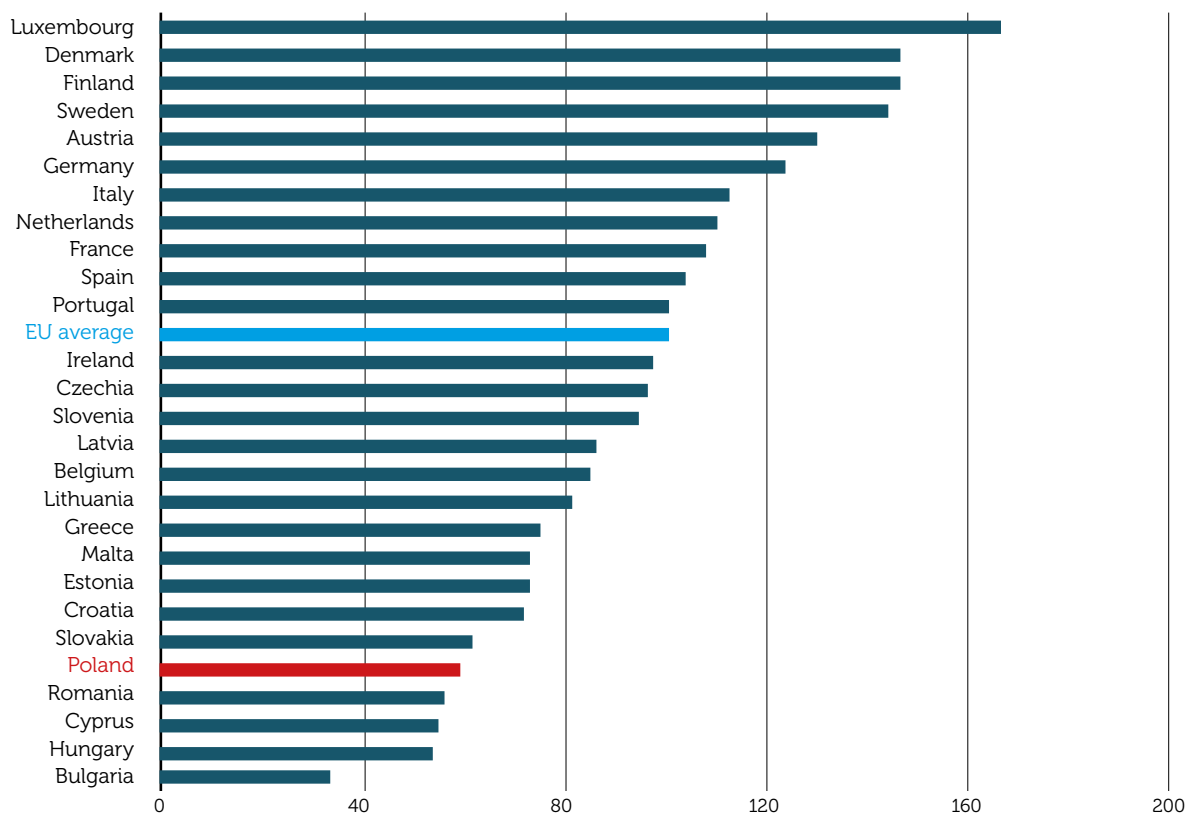
2. Bukowski, Fabrycka (2019): Circular construction in practice.

Figure 3 Material flows in Poland in 2018 (tonnes per capita)



Unfortunately, eco-innovation is also lagging behind compared to other European countries. In the European Eco-innovation Scoreboard 2019 edition, Poland ranked 24th among the EU countries, significantly below the EU average. The overall low score reflects the low innovativeness of the country in general.

Figure 4 European eco-innovation index for 2019

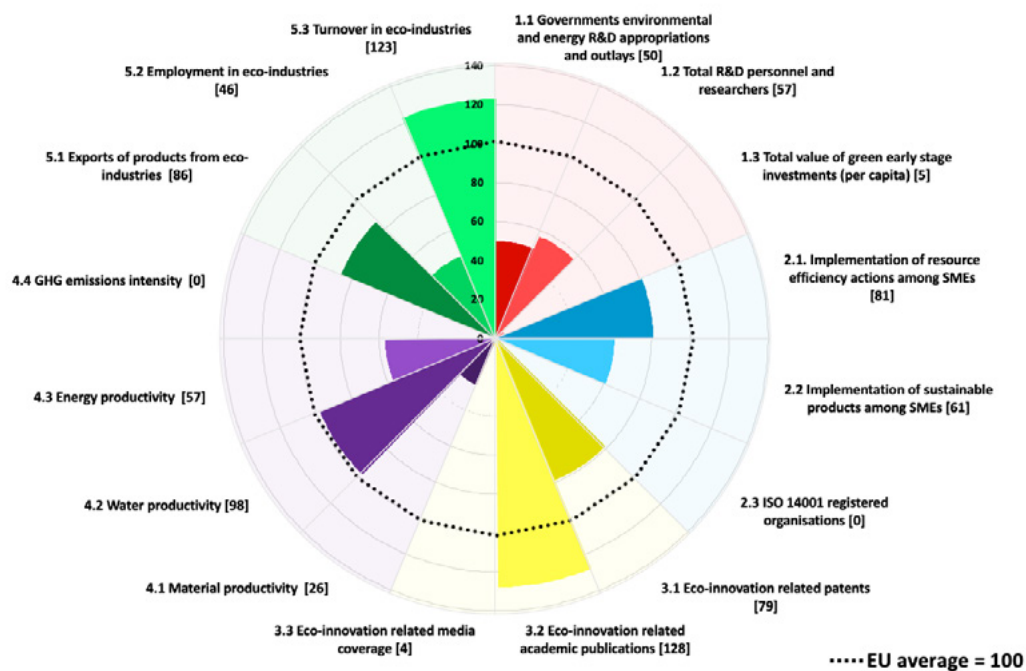


Source: European Commission (2020): Eco-innovation in Poland.



The low eco-innovation score is particularly a result of low investments and R&D outlays. A situation that foreign entrepreneurs could take advantage of.

Figure 5 All indicators of the Eco-innovation index for Poland, 2019



Source: European Commission (2020): Eco-innovation in Poland.

The bleak picture, painted by circularity indicators does not tell the whole story. There are more and more circular initiatives, ranging from grass-root projects to governmental actions. Commercial companies, both small and medium ones, as well as global corporations operating on the Polish market are eager to implement circular economic models in their products and services<sup>3</sup>. Though the scale of those endeavours is still to minuscule to affect the cited circularity indicators, there is a visible momentum to make a transition towards circularity.

Current Covid-19 pandemic, although an unfavourable event itself, could be used to further support the switch from a linear to circular economic model in Poland and in the whole world<sup>4</sup>. This is mostly visible from the macroeconomic perspective, as during the pandemic, people around the world started limiting their consumption, decreasing transportation, adjusting their dietary habits, etc. All of these actions provide evidence on our previous excessive usage of planet earth's valuable resources<sup>5</sup>. It is only now that the broad society in Poland has seen the staggering overcapacity of our assets and its overconsumption. This concerns office space and cars in particular. New, circular business models as well as modularity and standardization could help keep the decreased pressure on our planet's resources beyond the time of the pandemic.

3. Showcased inter alia by the members of Polish Circular Hotspot.

4. <https://www.weforum.org/agenda/2020/06/opportunities-circular-economy-post-covid-19/>

5. Material Economics (2020): the Circular Economy and Covid-19 Recovery. How pursuing a circular future for Europe fits with recovery from the economic crisis.

The pandemic is also an important opportunity for increasing the resilience of the Polish and the world's economy. Global economy's supply chains have proved to be unexpectedly fragile, as showcased by medical equipment, consumer electronic and lithium batteries markets in the beginning of the pandemic. Closing the loops, especially on the local level, should provide supply chains with appropriate flexibility and self-sufficiency on the regional scale, which makes the benefits of circularity even more compelling<sup>6</sup>. Designing out waste and pollution, keeping products and materials in use to the greatest possible extent and regenerating natural systems could prepare our economy for future crises<sup>7</sup>.

## 1.2 Regulatory landscape

Polish regulations related to the implementation of the circular economy are a direct result of legislation at the EU level. Legal acts supporting the implementation of this concept have been translated into Polish legislation and constitute the basis for the activities of the Polish government aimed at transitioning from a linear economic model towards a circular one.

For the current term the European Commission has set itself the goal of continuing the direction of implementing the circular economic model<sup>8</sup>. The introduced changes will soon also apply in Poland. The creation of an appropriate legal framework is expected to make sustainable products, services and business models a core activity, primarily with the aim of preventing waste. The development of the secondary raw materials market, a more complete application of the principles of eco-design in as many products as possible and further expansion of producer responsibility are also prioritized.

There is relatively little interest among Polish regulators to implement additional strategies and programmes on the national level, beyond those proposed on the EU level. The general, cross-sectoral and specific targets and goals are still lacking, while they are quite essential to the advancement of circular economy. There are however some examples of such actions. Among those, the most notable one is the Roadmap for the transformation towards a circular economy<sup>9</sup>. It sets the directions for the transformation of the Polish economic model from a linear to a circular one. The key priorities for building circular economy in Poland highlighted in the document are:

**Innovativeness, strengthening cooperation between industry and the science sector - as a result, implementing innovative solutions in the economy.**



**Creation of a European market for secondary raw materials in which their movement would be facilitated.**

**Development of the service sector.**



**Providing high-quality secondary raw materials, as a result of sustainable production and consumption.**



6. Doussoulin (2020): COVID-19: Turning a Threat into an Opportunity for the Circular Economy.

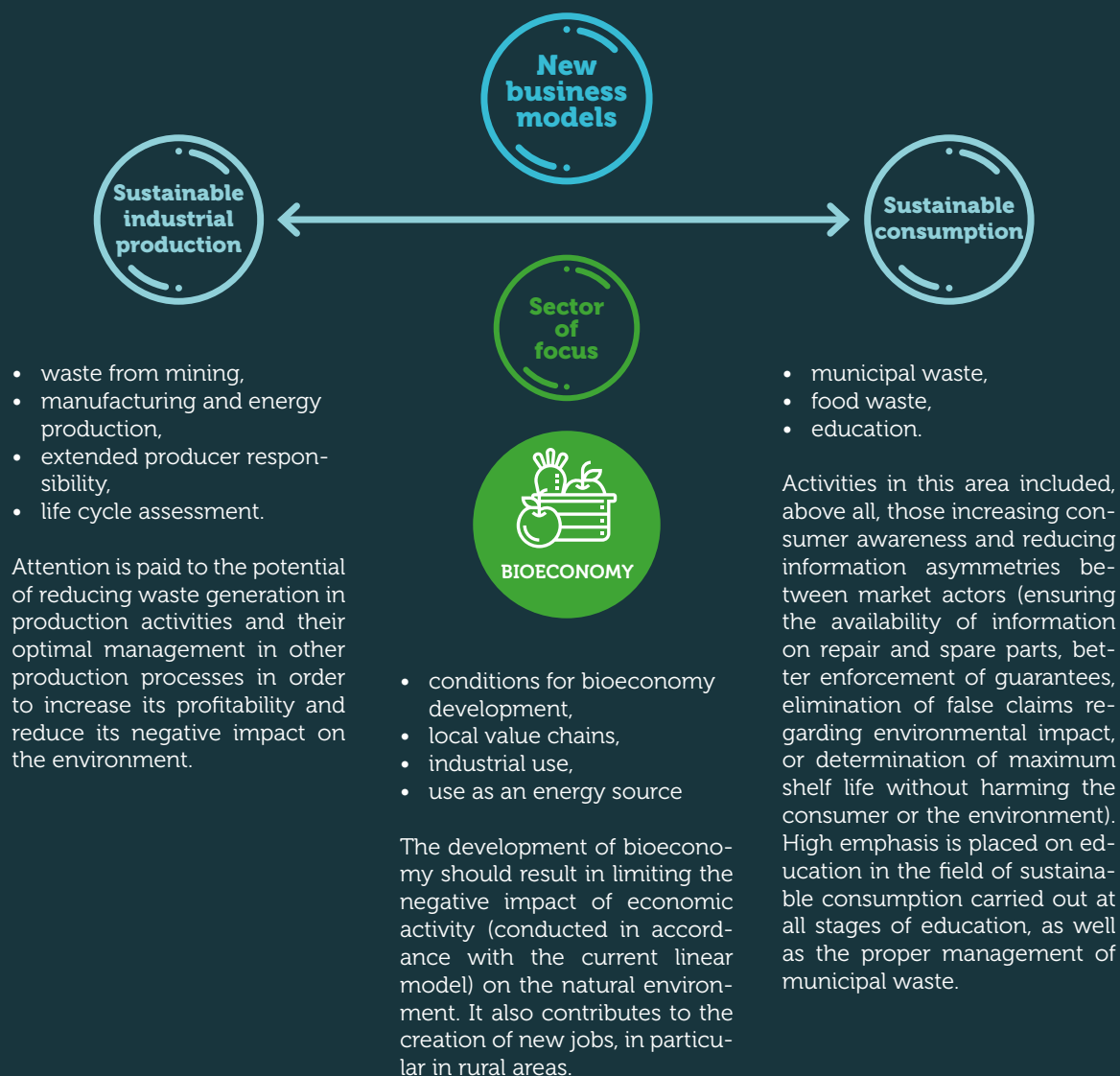
7. <http://www.fao.org/land-water/overview/covid19/circular/en/>

8. European Commission (2020): Circular Economy Action Plan.

9. Kancelaria Prezesa Rady Ministrów (2019): Mapa drogowa transformacji w kierunku gospodarki o obiegu zamkniętym.

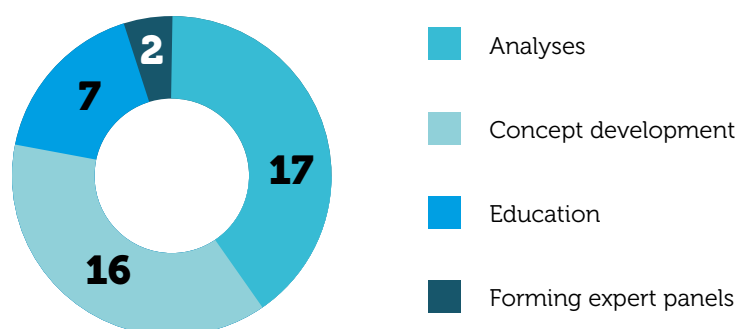
## In order to implement the above-mentioned priorities, the roadmap distinguishes measures in the following areas:

The roadmap raises the issue of cooperation, not only between consumers and producers, but also among producers and between entrepreneurs, scientists and the public sector. This cooperation was identified as a key element of circular business models. As a consequence of this cooperation, resource productivity increases significantly. Attention is paid to social economy entities as a source of new solutions in the area of business models. These entities provide services tailored to the needs of the community, raise its awareness and reduce social exclusion.
















Unfortunately, among specific activities enumerated in the roadmap there are few significant ones. Most of the activities take the form of analyses and concept development (78,6% of total number of activities). They may be the basis for further development of legislative acts facilitating circular economy implementation, nevertheless they provide little direct support for the concept's implementation. The same conclusion applies to the remaining activities, which have mostly educational purposes.

Figure 6 Types of activities included in the Roadmap for the transformation towards a circular economy



Source: Own elaboration based on Kancelaria Prezesa Rady Ministrów (2019): Mapa drogowa transformacji w kierunku gospodarki o obiegu zamkniętym.

Other type of Government's strategy regarding transitioning towards circular economic model is encapsulated in the 2030 National Environmental Policy<sup>10</sup>. The role of the policy is to ensure Poland's ecological safety and high quality of people's lives. It will also become one of the bases for European funds absorption during the 2021-2027 EU financial framework. National Environmental Policy also supports the implementation of Poland's objectives and commitments at the international level, including those of the EU and the UN, especially in the context of the EU's climate and energy policy objectives for 2030 and the sustainable development goals (SDGs) included in Agenda 2030. The specific directions of intervention included in the policy are:

	sustainable water management, including ensuring access to clean water for society and economy, and achieving good water status,		elimination of air pollutant emission sources or significant reduction of their impact,
	protection of the earth's surface, including soils,		counteracting environmental threats and ensuring biological, nuclear and radiological protection,
	management of natural and cultural heritage resources, including protection and improvement of biological diversity and landscape,		supporting multifunctional and sustainable forest management,
	waste management towards a circular economy,		management of geological resources by developing and implementing the state resource policy,
	supporting the implementation of eco-innovation and disseminating the best available techniques BAT (best available techniques),		counteracting climate change,
	adaptation to climate change and managing the risk of natural disasters,		environmental education, including shaping sustainable consumption patterns,
	improvement of the environmental protection control and management system and improvement of the financing system.		

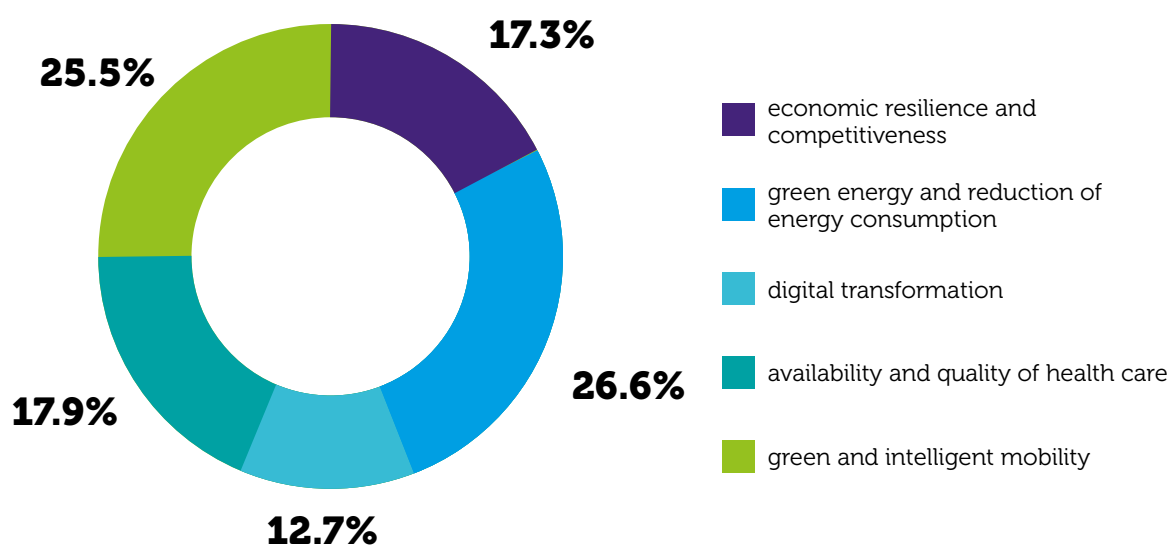
10. Kancelaria Prezesa Rady Ministrów (2019): Polityka Ekologiczna Państwa 2030

The transition towards circular economy offers an all-encompassing approach to achieving the goals stated in the 2030 National Environmental Policy, as all of the aforementioned directions of intervention described in the policy are connected to the notion of circular economy. However only the goal of waste management improvement mentions the concept directly. Apart from this single exception, directions of intervention do not state the means or ways to attain the desired objective, while it is the circular economic model that offers the possibility of achieving them.

There is a number of other policy measures adopted recently that somewhat relate to the concept of circular economy. They include e.g. regulations and programmes to support the development of electromobility in Poland<sup>11</sup>, as well as an act aimed at limiting food waste<sup>12</sup>.

The Polish government is in the process of consulting the National Reconstruction Plan (Krajowy Plan Odbudowy i Zwiększania Odporności<sup>13</sup>) that will be the basis for acquiring financing from the European Union's Reconstruction Fund and its largest part - the Recovery and Resilience Facility. The fund is the European response to new threats and challenges caused by the pandemic, with the goals of restoring its economy and building resilience to possible future crises. As part of the Recovery and Resilience Facility, Poland will receive ca. EUR 23.1 billion in the form of subsidies and EUR 34.2 billion in loans to be used by 2026. Although the National Reconstruction Plan is still consulted, the government has already stated financial support and proposed the division of subsidies for businesses, innovation, infrastructure, healthcare, green energy, digitization and measures to protect climate and ensure clean air. This also means financing of investments connected with circular economy, though specific focus on this topic is still to be confirmed.

Figure 7 Division of available subsidies according to National Reconstruction Plan draft.



Źródła: KPRM (2021): Krajowy Plan Odbudowy i Zwiększania Odporności, February 2021 draft.

11. Electromobility and alternative fuels bill of 11 January 2018 (Dz. U. 2018 poz. 317).

12. Counteracting food waste bill of 19 February 2019 (Dz.U. 2019 poz. 1680).

13. KPRM (2021): Krajowy Plan Odbudowy i Zwiększania Odporności, February 2021 draft.

## 1.3 Fundamental drivers of circular economy in Poland



### Regulatory push towards circularity

Existing and prospective regulations, especially on the EU level, fuel transition towards the circular economy.



### Circular activities gain momentum

Consumer demand is gradually shifting towards more sustainable products. There is a growing number of initiatives that aim to educate, train, inform and transfer knowledge on the circular economic model.



### Companies prioritize cost reduction - resource use as well

Cost reduction was and still is, one of the main objectives of Polish businesses. This also concerns cost of water, materials and energy (also emission trade scheme costs), which is in line with resource use reduction as a result of the implementation of the concept of circular economy.



### Financial incentives support circularity

Grants, subsidies, loans and other public financial incentives for circular business activities are available on the EU and national level. These concern EU funds in particular, as Poland is one of the biggest beneficiaries of the EU 2021-2027 financial framework, but also concern special economic zones, tax exemptions for certain investments, tax relief on innovation and property rights incomes.

## 1.4 Fundamental barriers to circular economy in Poland

### • Prioritizing short-term price



Consumers and companies (also public ones<sup>14</sup>) are still primarily prioritizing short-term costs over long-term economic and environmental outcomes. In effect the limited demand restricts attaining economies of scale for circular products, which results in a vicious cycle of high prices and low scale production.

### • Insufficient business environment development



Lack of appropriate business environment in the form of subcontractors, circular materials provision, waste collection systems, etc. Increasing innovation and competitiveness in sectors typically focused on price minimization requires intensive cross-sector cooperation between companies and appropriate diffusion of knowledge at the national level, which is still lacking.

### • Underestimated role of information



Limited access to reliable information, interest in such data and lack of trust between the seller and the buyer. Information about the origin and entire life cycle of a product is hard to acquire, thus it does not influence consumption choices to the extent it should.

14. Public procurement law and practices in Poland do not prioritise circularity oriented selection criteria. For example in 2017 only 0,01% (17) of total public procurements used lifecycle assessment (LCA) in the procedures.

- **Insufficient research and development efforts**



Weak industry-science links as well as insufficient research effort limits international competitiveness. While large companies are more likely to innovate, small and medium enterprises are reluctant to do so. There is insufficient awareness about possible benefits of implementing innovative circular solutions and weak knowledge about tools supporting circular assessment in value chain i.e. EPD, carbon footprint, environmental footprint, ETV, etc.

- **Legal instability**



In order to thrive, it is necessary to ensure adequate legal stability for circular technologies and businesses. This applies to the entire system and the predictability of the directions of its changes, as well as the modification of detailed regulations. In this context, specifically both reporting and technical requirements on waste change exceptionally frequently.

# chapter 2



## **Links between the Netherlands and Poland in regards to circular opportunities**

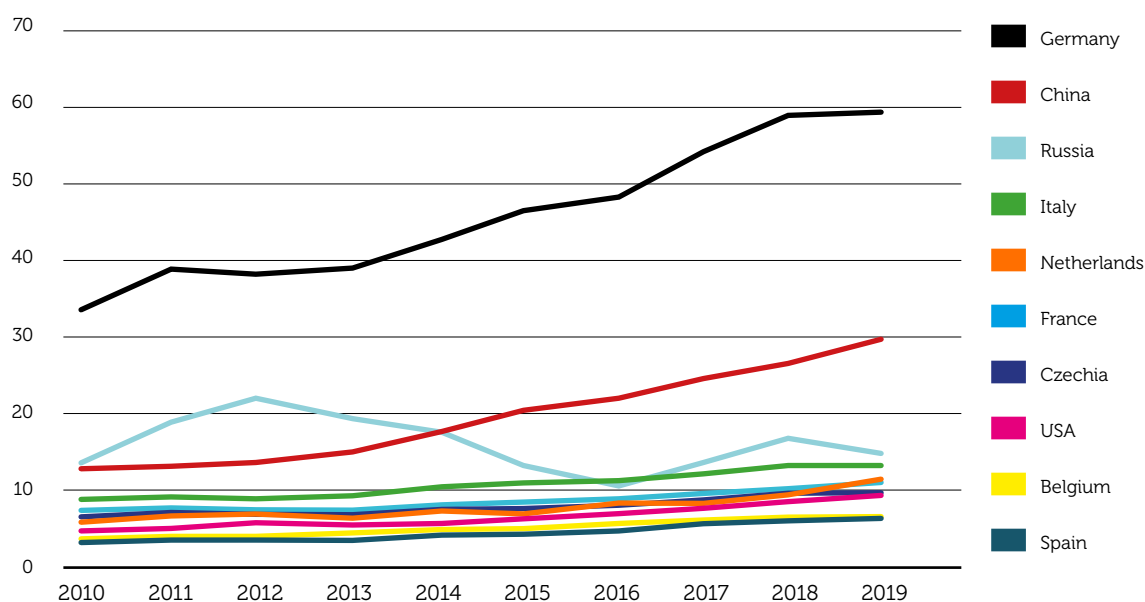




## 2.1 Overview of trade connections between the Netherlands and Poland

In the last decade Polish burgeoning economy has seen a steady rise in the value of goods and services imported. This growth has come, inter alia, from the Netherlands. During the 2010-2019 period imports from the Netherlands to Poland have seen an almost twofold increase. The country has become the fifth biggest source of imports of goods and services to the Polish economy, while ten years earlier it took the 7th place. It seems that the Dutch-Polish trade relations are strengthening year by year. Judging by the dynamics in the 2010-2019 period in five years imports from the Netherlands could overtake those from Russia.

Figure 8 Imports of goods and services to Poland from top ten countries (in bln EUR)

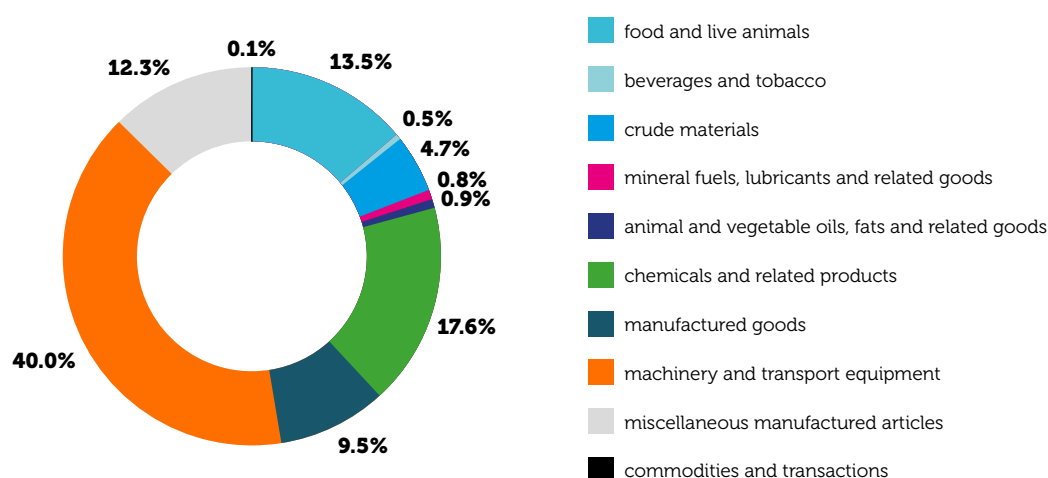


Source: Polish Statistical Office.

According to CBS (Centraal Bureau voor de Statistiek, eng. Statistics Netherlands) the value of Dutch exports to the country, as of 2019 place Poland as its eight most important export market. Furthermore the growth observed in the 2012-2019 period (58,2%) was significantly higher than the average for top fifteen countries (15,1%), and was second only to China (67,3%) among this group of countries.

By far, the most significant category of exports to Poland is machinery and transport equipment, which constituted 40% of total exports. Chemical and related products came second with 17,6%, followed by food and live animals (13,5%), miscellaneous manufactured articles (12,3%) and manufactured goods (9,5%).

Figure 9 Composition of types of goods exported from the Netherlands to Poland in 2019

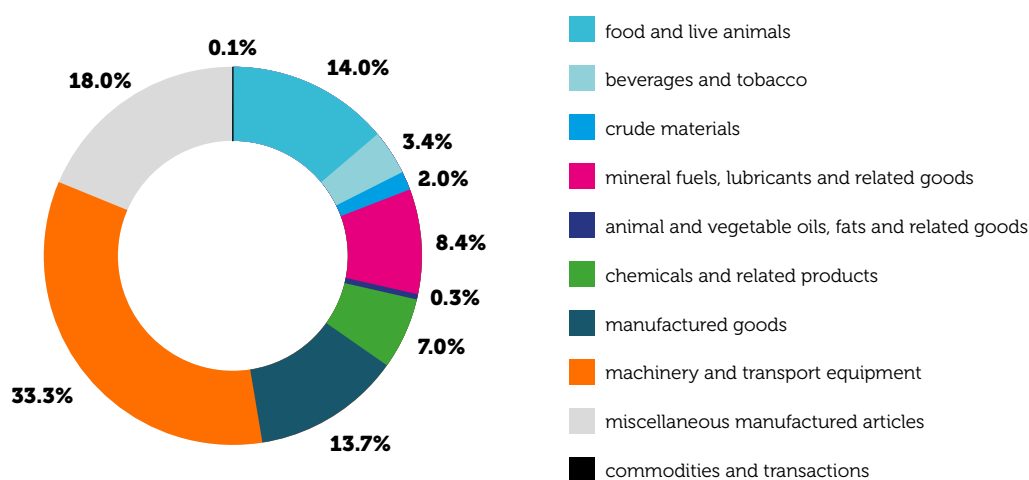


Source: Centraal Bureau voor de Statistiek

Imports from Poland to the Netherlands have also seen a considerable growth the numbers in 2012-2019 period. In fact, imports grew faster than exports, 66,2% compared to 58,2% respectively. Among top fifteen trade partners only Ireland has seen higher dynamics. This resulted in Poland ranking 11th (an improvement by two positions compared to 2012) on the list of Dutch most important import partners.

The types of goods imported to the Netherlands from Poland somewhat resembles those exported. Machinery and transport equipment is the most important import category, while food and live animals category takes third place with 14% of total imports. However, manufactured goods and articles imports are proportionally more significant than their exports (31,7% of total imports, compared to 21,8% of exports). The same applies to mineral fuels and lubricants. On the other hand, chemicals and related products, an important export category, is less significant in the imports composition.

Figure 10 Composition of types of goods imported to the Netherlands from Poland in 2019



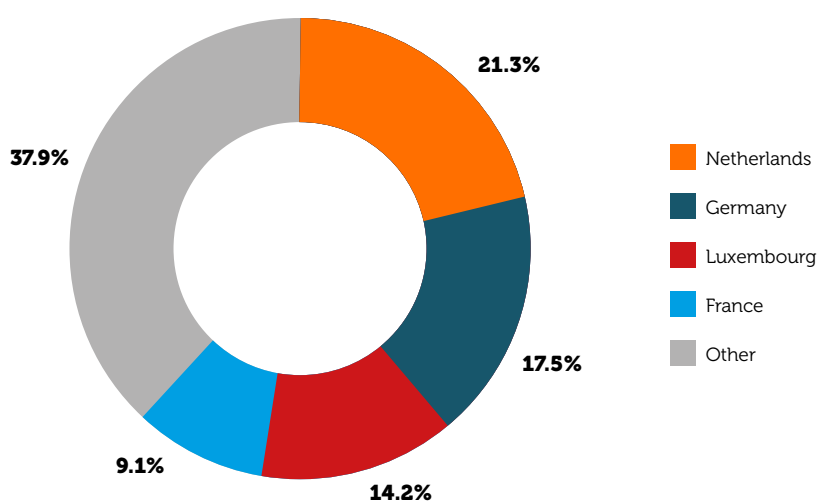
Source: Centraal Bureau voor de Statistiek

## 2.2 Overview of investment inflows from the Netherlands into Poland

Since the economic transformation, after the collapse of the communist regime, there has been a stable interest of foreign entrepreneurs to engage in activities on the Polish market. Historically, the most popular sectors for foreign investors included automotive, information technology, food products, logistics, pharmaceuticals, paper production, appliances and financial services<sup>15</sup>. Poland is also a popular location for business processing centres, including call centres, shared services centres and research and development operations. Dutch companies have been present in these areas as well as the Netherlands which is one of the biggest foreign investors in the world and ranks second in Europe after Luxembourg<sup>16</sup>.

In 2018 the Netherlands is by far the biggest foreign investor in Poland<sup>17</sup>. The inflow of 7 bln EUR (31,6 bln PLN) accounted for approx. 63% of the total value of foreign direct investments in 2018<sup>18</sup>. As of the end of 2018 liabilities to direct investors from the Netherlands amounted to 40,5 bln EUR (PLN 183.4 billion), i.e. 21.3% of the total liabilities to direct foreign investors - the highest portion among any country.

Figure 11 Composition of foreign direct investments in Poland broken down by geography as of the end of 2018



Source: National Bank of Poland

The statistics of foreign direct investments in Poland according to the country of the seat of the parent entity in the capital group to which the direct investing belongs (UIC - ultimate investing country) gives a slightly different picture of the geographical structure of liabilities due to inward direct investments in Poland. This is an outcome of many foreign companies with a global reach choosing Netherlands as their 'European headquarters'. The most important ones include American, British, Belgian, German and Japanese companies, while their operations mainly concern mining, petrochemical production,

15. Polish Investment & Trade Agency (2019): Investment climate in Poland.

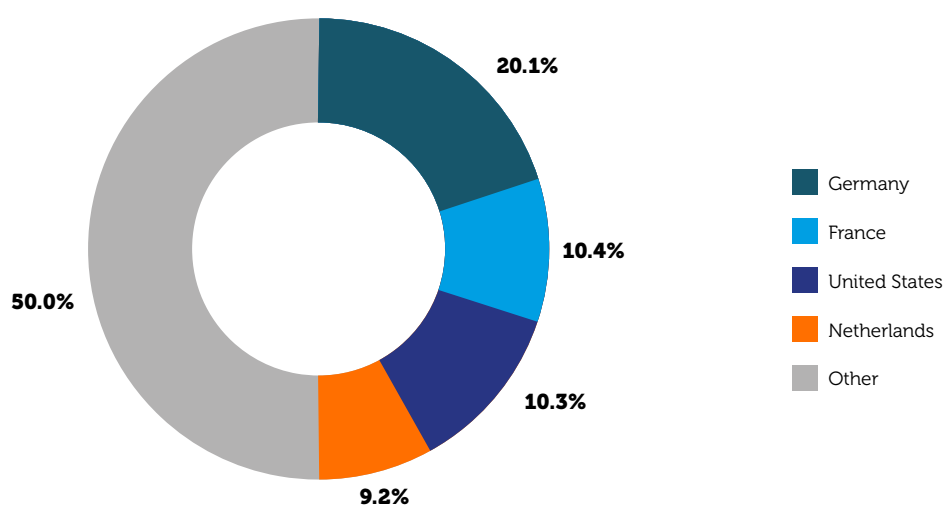
16. Based on OECD data in USD, 2018 or latest available (outward FDI stocks by partner country).

17. Narodowy Bank Polski (2020): Zagraniczne inwestycje bezpośrednie w Polsce i polskie inwestycje bezpośrednie za granicą w 2018 roku.

18. It has to be noted that in 2018 a one-off transaction has resulted at significantly higher foreign direct inflows from Netherlands and, at the same time outflows from Spain.

food industries, banking and insurance services. This is due to the central location of the Netherlands in Western Europe, the proximity of the largest economic markets, as well as legal and tax facilities for foreign investors. Therefore a big chunk of foreign investments from Netherlands have a multinational origin. Thus, when using ultimate investing country perspective, the value of liabilities to Dutch investors is significantly reduced and in 2018 amounted to EUR 17,4 billion (PLN 78.7 billion). This places the Netherlands fourth on the list of biggest investors in Poland.

Figure 12 Composition of foreign direct investments in Poland according to ultimate investing country as of the end of 2018



Source: National Bank of Poland

### Among the biggest foreign investors registered in the Netherlands are:

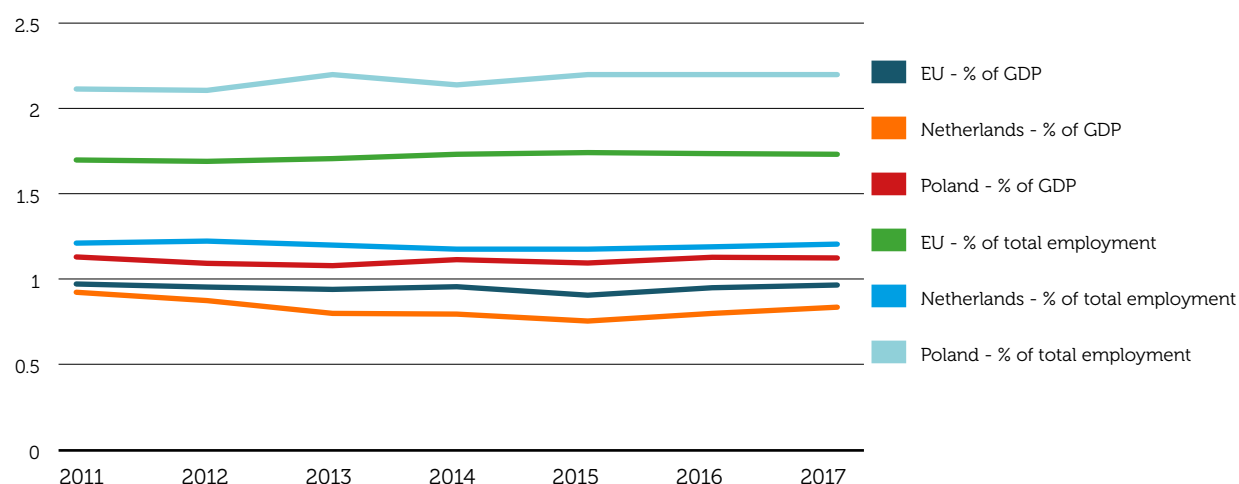
**AkzoNobel**, paints and chemical products;  
**BP**, petrochemical production;  
**CBR Baltic B.V.**, production of cement and gypsum;  
**Damen Shipyards Group**, shipyard;  
**DSM B.V.**, nutrition, health and sustainable living;  
**Harbin B.V.**, breweries;  
**Heineken International B.V.**, breweries;  
**ING group**, banking, finance, real estate;  
**Philip Morris Holland B.V.**, tobacco products;  
**Procter & Gamble**, consumer goods;  
**Randstad**, human resource consulting;  
**Royal Philips Electronics N.V.**, lighting equipment;  
**Shell**, petrochemical production,  
**Unilever**, consumer goods.

## 2.3 Identification of biggest businesses in Poland related to circular economy concept

There is a number of classifications of circular businesses. The most rudimentary approach comes from Eurostat. The statistical office of European Union defines sectors which are related to circular economy according to NACE rev.2 classification<sup>19</sup>. The sectors concern only two areas: recycling as well as repair and reuse. This narrows down the circularity scope for companies and could only be assessed as a proxy for circular businesses. Nevertheless it gives a simplistic method for identifying circular businesses in Poland.

In the last decade the aforementioned areas of business activities in Poland have been relatively stable, when economic value added is concerned, while the employment has risen only slightly. The two indicators' levels have been relatively higher than in the European Union and the Netherlands. This however does not imply that Poland is more advanced in circular model implementation. It is more likely that the overall lower development of the Polish economy results in higher numbers for those indicators. This is corroborated by a decrease in value added by those two areas of activity in the Netherlands, despite the observed growth of other circularity indicators (see chapter 1.1).

Figure 13 Employment (in % of total employment) and gross value added (in % of GDP) related to circular economy sectors.



Source: Eurostat.

In the recycling area in Poland, the most important businesses are those connected to managing metals and scrap waste. An overwhelming number of companies dealing with aluminium, iron or steel products use recycled materials<sup>20</sup>. Among notable examples of aluminium packaging businesses

19. Vide: [https://ec.europa.eu/eurostat/documents/8105938/8465062/cei\\_cie010\\_esmsip\\_NACE-codes.pdf](https://ec.europa.eu/eurostat/documents/8105938/8465062/cei_cie010_esmsip_NACE-codes.pdf) (accessed on January 14 2021).

20. According to available data, in Poland approximately 2/3 of iron production comes from recycling operations (see: <https://www.stenarecycling.pl/top-menu/aktualnosci/zlom-elazny--jak-wykorzysta-100-potencjau/>). The last aluminum smelter using raw materials has switched to 100% recycling content in 2009 (Hurta Konin). Of course this does not imply that no raw aluminum is used in Poland as it is imported. Nevertheless aluminum products produced in Poland in a significant proportion are made from recycled materials.

are Can-Pack and Ardagh Metal Beverage Trading Poland. There is a number of aluminium using construction products companies as well, e.g. Grupa Kęty, Alumetal SA, Aluprof SA. The same concerns the steel industry, which predominantly sources its materials from scrap. The most important players on this market are: Impexmetal, CMC Poland, Celsa Huta Ostrowiec, and many more (16 among top 500 biggest companies in Poland<sup>21</sup>). Among the biggest companies in Poland operating in recycling there are notable examples of companies operating strictly with circular concept in mind. Elemental Holding S.A. recycles waste electrical and electronic equipment (WEEE) and catalytic converters, and aims to treat waste as a resource. Nicromet is an aluminium recycling company with sustainability as one of their core values.

Among the reuse area there is a number of disparate business activities. One of them is providing platforms for reusing products and materials. Allegro and OLX are leaders in this domain on the Polish market. In recent years there has been a growing interest in used clothing. Vive Textiles (established by a Dutch entrepreneur in Poland) is the leading provider of used clothes in Poland.

The repair area is notably represented by shipyards dealing with ship renovation. Two biggest of them are Grupa Kapitałowa Remontowa Holding and Gdańska Stocznia Remontowa. Other repair companies take on car maintenance. Among them providers of spare parts are the most important entities. These are e.g. Inter Cars and Moto-Profil.

Among other types of companies with circular concepts in mind, one can surely distinguish those operating in modular constructions. Among 500 biggest companies in Poland there are two such example: Goldbeck and Pekabex.

Among the companies enumerated above there is a significant representation of those with at least a portion of foreign capital involved. Typically, foreign investments occurred only after companies became successful, in some cases after their listing on the stock exchange.

## 2.4 Identifying Polish businesses with circularity as their core competence

There is a gradually growing number of start-ups and small companies that put circular concept as the focus of their activities. They are typically small and medium enterprises that still need to prove their long-term economic viability. Their activities centre around making use of state-of-the-art technologies or trying to cater to ecologically-aware consumers.

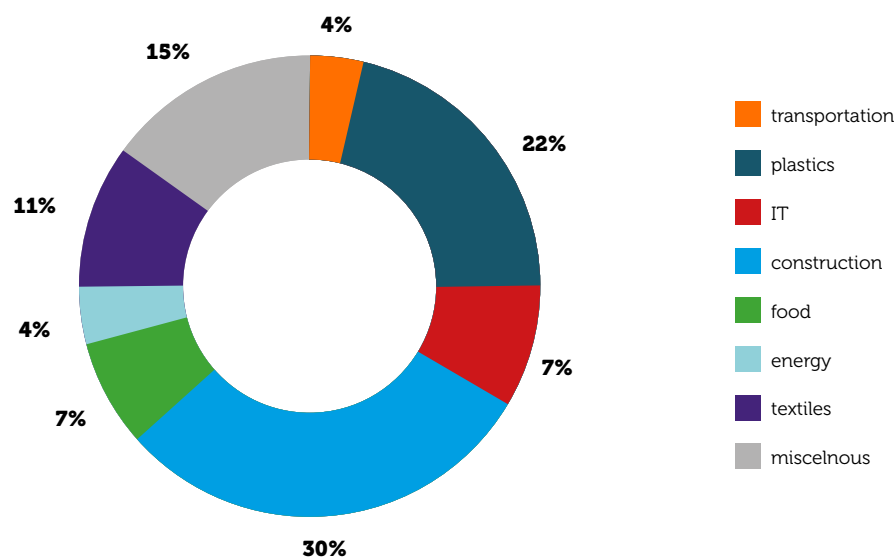
Polish Circular Hotspot participants analysis may provide insight on types of circular businesses in Poland. The Polish Circular Hotspot is a platform for cooperation of stakeholders interested in the implementation of the circular economic model in Poland. Among its members commercial entities form the majority.

Most of the companies operate in the construction sector and range from 3D-printed housing (Rebuild) to enabling energy-construction industrial symbiosis (Eco-Tech). The second area where companies show the most interest is tackling the problem of plastics overconsumption and inappropriate plastic waste management (e.g. TOMRA). Textile sector is an area where companies are engaged in the imple-

21. Vide: [https://rankingi.rp.pl/lista2000/2020/lista\\_2000](https://rankingi.rp.pl/lista2000/2020/lista_2000) (accessed on January 14 2021).

mentation of the circular economic model as well. This ranges from production of sustainable clothing (Bohema clothing) to upcycling (Dekoeko). Analysis of Polish Circular Hotspot's members shows that other important areas for circular transformation are: food, energy and IT.

Figure 14 Composition of Polish Circular Hotspot members according to sectors they operate in



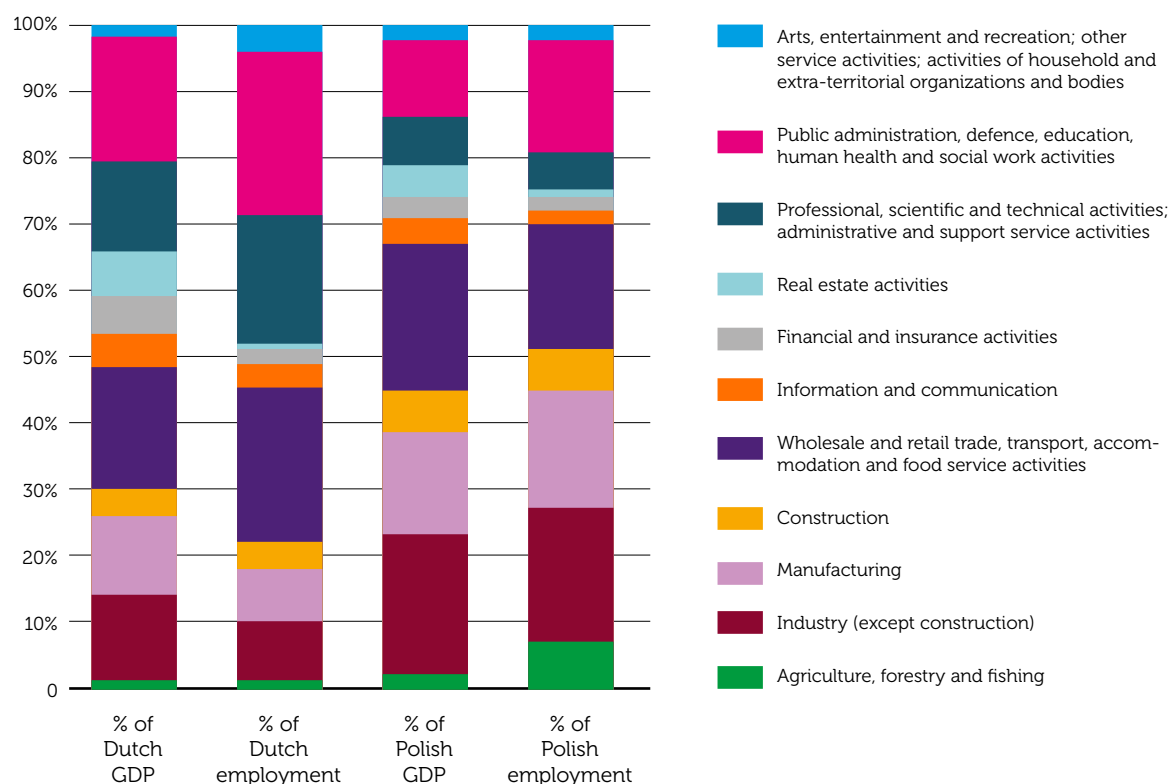
Source: own elaborations.

From a vantage point it seems that businesses with circularity at their core, are focused either on providing ecological replacements for current mainstream products and services or increasing productivity compared to currently available methods. They are more interested in using modern technologies (e.g. they offer their services in a mobile applications, use 3D printing) than current market leaders. At the same time it seems that, despite growing consumer awareness, lack of appropriate business environment, financing opportunities, etc. precludes or hinders the process of scaling-up their endeavours. Typically such companies operate in a niche.

## 2.5 Analysing Dutch circular businesses and their overall business potential in Polish market conditions - demand and supply analysis

Polish and Dutch economies differ in many important aspects. As of 2019 the Netherlands is the fifth most developed economy in the EU (judging by GDP per capita), while Poland ranks fifth less developed country, by the same measure. In fact, according to Eurostat, the GDP per capita for the Netherlands is over three times that of Poland in 2019 (EUR 41,9 thousand and 13,0 thousand respectively). The economic development also manifests itself in different compositions of sectors in the total production and employment in each country. Dutch economy is visibly more service-oriented, while the Polish one is still dependant on its historical heritage, with a decisively higher importance of industry, agriculture and manufacturing, especially in terms of employment.

Figure 15 Composition of gross domestic product and employment in the Netherlands and Poland in 2019.



Source: Eurostat.

These relative differences can be put to a good use, by facilitating trade and fuelling cooperation between the two economies. The circular model implementation could further enhance cooperation and result in finding synergies between the two economies and by complementing each other. Especially, as explained below, Dutch economic activities as well as developed technologies match the Polish resources supply in the sectors prioritized by the Dutch government.

With 85,000 circular economy initiatives as of 2018, including 420,000 jobs<sup>22</sup>, the Netherlands is the leader in the implementation of circular economy in Europe and in the whole world. The process of circular model implementation in the Netherlands is greatly facilitated by the government, which chooses to prioritize sectors that already held a competitive edge compared to other economies.

The Dutch circular economy programme aims to fully implement circularity in the country by 2050<sup>23</sup>. The interim goal is to reduce the use of primary resources by half by 2030. This means that by 2050 raw materials will be used efficiently without any harmful emissions to the environment. The implementation of these goals is based on three basic pillars:

22. PBL Netherlands Environmental Assessment Agency (2019): Outline of the Circular Economy.

23. Government of the Netherlands (2016): A circular economy in the Netherlands by 2050.



- Ensuring raw materials in existing supply chains are used optimally.
- Where primary raw materials are needed, fossil, critical and unsustainably produced raw materials are replaced by sustainable, renewable and generally available raw materials.
- New production methods are developed, new products are designed, and new consumption methods are promoted.

The programme focuses on five priorities that are important for the Dutch economy, have a significant impact on the environment, are characterized by the already existing social momentum aimed at the transition to the circular economic model and correspond to the priorities set by the European Commission. The five priorities and their objectives are:



**Biomass  
and food**



**Plastics**



**The manufacturing  
industry**



**Construction  
sector**



**Consumer  
goods**

The above-mentioned priority sectors already receive special support from the Dutch regulators and have already shown to be the areas in which circular businesses could thrive.

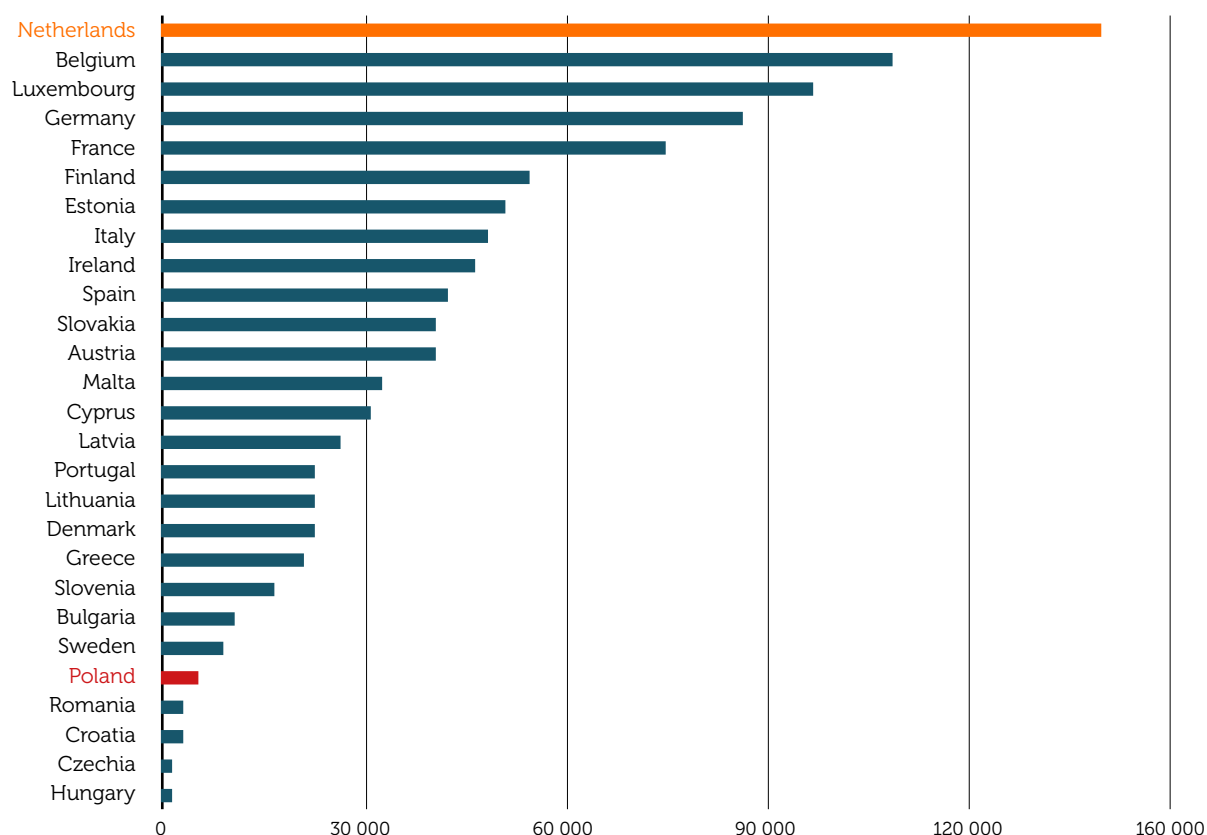


The Netherlands is the fifth largest exporter of agricultural products in the world<sup>24</sup>. The horticulture sector is also an important segment of the economy. The country is a leader in the production of flowers, plants and seeds. The strong position is the result of high intensity of cultivation and breeding. This intensive agricultural production is fuelled by state-of-the-art technologies. In recent years some of those technologies as well as business models used were being built around the concept of circularity. Some examples include renewable energy sources, low-energy horticultural production, aquaponic systems or platforms matching producers and consumers in local areas<sup>25</sup>. These and other circular solutions could be used in Poland. This possibility is even more pronounced as Polish agricultural sector in the 2004-2017 period showed almost the lowest productivity of resources in relation to other EU countries. Its competitive advantages resulted mainly from price considerations. However, due to the unification of markets and increased global trade the productivity rise in Polish agriculture seems a necessity. Therefore, any processes that increase productivity, such as: the implementation of new technologies and business models, e.g. digitization, data analysis, farms integration allowing to achieve economies of scale and reducing transactions would be desirable. If these changes are in line with the concept of circular economy, negative externalities could be limited with a benefit to the environment.

24. Based on World Bank data for 2018.

25. See: Lękowska, Kowalczyk (2020): Zamykamy obieg w rolnictwie – zrównoważone wykorzystanie energii w produkcji rolnej i szklarniowej.

Figure 16 2004-2017 average productivity of labour in agricultural sector (EUR/Annual Work Unit)



Source: Smędzik-Ambroży et al. (2019): Productivity of Polish agricultural sector compared to European Union member states in 2004-2017 based on FADN farms.



Circular businesses in the Netherlands have also taken on the problem of plastics. This specifically concerns tackling environmental pollution, developing new types of plastic materials, methods for collecting and handling plastic waste. The current low use of recycled plastics is the aftermath of manufacturers' fear that recycled plastics will not meet their needs for a reliable, high-volume supply of materials with constant quality specifications (e.g. for food grade applications) as recycling companies in Europe are predominantly small and regional facilities<sup>26</sup>. Those fears have materialised also in Poland as companies notice an insufficient supply of recycled plastic. They face problems with acquiring recycled material in the amount sufficient to meet their growing demand (especially in the recycled PET area)<sup>27</sup>.

However, these types of circular businesses are aimed at broad implementation, preferably in international supply chains. In result, the perspectives for circular businesses' success in the sector are not country-specific. As almost every country in the world uses plastics to a great extent, choosing one region over another in applying new circular solutions should be based on specific business characteristics.

26. See: European Commission (2018): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A European Strategy for Plastics in a Circular Economy.

27. See: <https://www.plasticsnews.com/news/global-pe-market-faces-most-formidable-set-issues-pp-keeps-rolling>



Through the last decades the developed nations have seen their manufacturing sectors dwindle, while production processes have been transferred to countries with cheaper production resources. The Netherlands, as one of the largest global investors, has been on the forefront of such changes. However such actions concern typically mature businesses and not circular ones, which in most cases cannot afford to produce globally. In effect their production is usually local, with only some materials and production elements being sourced from other markets. Although these local processes could not make use of global production capacity, the ones available on the EU market are relatively easily accessible. Poland is one of the EU's markets whose industrial heritage and competitive production factors' costs could be used to the advantage of Dutch circular businesses.

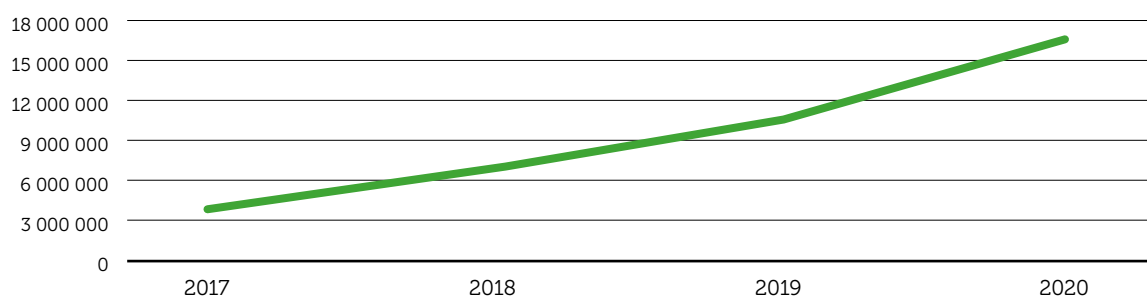


Construction is widely regarded as the most polluting industry in the EU and the world. Circular concepts are aimed at decreasing the overall ecological footprint of the industry and at the same time using resources in a more productive manner, specifically by closing material loops. The Dutch are one of the global leaders in circular construction with numerous examples of energy-efficient, durable or modular buildings like Venlo city hall, Veluvine in Nunspeet or Circl building, to name a few. Circular construction businesses in the Netherlands take different forms. The most important ones are:

- companies supporting construction with digitalization technologies (e.g. Madaster)
- circular material technologies (e.g. Forbo)
- circular building design (e.g. Cepezed architects)
- material reuse and recycling (e.g. Polystyrene Loop project)

This holistic, all-encompassing approach to circular buildings has the advantage of the possibility to match specific technologies and business models with the approached market needs. In case of Poland, it seems that the most pressing necessities lie in the area of limiting asymmetry of information on the market and raising the overall quality of data<sup>28</sup>, swapping downcycling activities for recycling, and changing entrepreneurs' perspective on the benefits of using circular solutions, i.e. long-term cost-benefit calculation instead of a short-term cost criterion<sup>29</sup>. It seems that the Polish construction sector shareholders' awareness is steadily growing, especially for those investing in commercial-use buildings, as showcased by dynamically growing usable area of certified green buildings in Poland<sup>30</sup>. This might provide an opportunity for Dutch circular construction companies to successfully offer their products on the Polish market.

Figure 17 Certified green building usable area in Poland (m<sup>2</sup>)



Source: Polish Green Building Council.

28. Bukowski, Fabrycka (2019): Circular construction in practice.

29. Hart et al. (2019): Barriers and drivers in a circular economy: the case of the built environment.

30. Plebankiewicz et al. (2019): Trends, Costs, and Benefits of Green Certification of Office Buildings: A Polish Perspective.

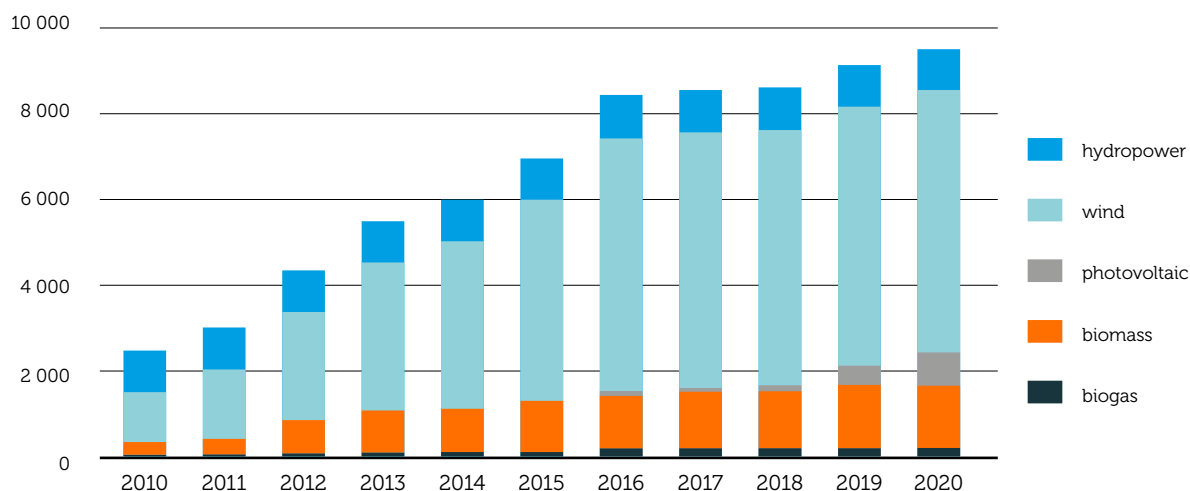


Entrepreneurs who are interested in establishing a circular business are typically drawn to consumer goods sector. It is the most versatile branch of the economy, where finding a niche, typically needed for small scale endeavours, is relatively easy. The same rationale applies to Dutch circular businesses. They typically cater to ecologically-aware consumers who are willing to pay higher prices to diminish their environmental externalities. Except for offering circular material goods (e.g. Fairphone), this also concerns using circular business models, e.g. product as a service (e.g. Bundles). Unfortunately, there are few examples of companies that scaled up their business in the area of circular consumer goods. It seems the lack of the economies of scale results in too high of a price to attract a sizeable number of consumers. This situation is even more pronounced in Poland, where price factor is still the main criterion for consumer choices.



There is one sector, that has not been explicitly mentioned in the governmental plan for circular economy in the Netherlands, while it is on the forefront of circular transition in the country i.e. the energy sector. The Netherlands is one of the leaders of renewable energy sector, while its products and services might find considerable demand in countries that already are on the path towards a more sustainable energy sources' composition<sup>31</sup>. Poland, with its recent boom on photovoltaic installations and growing wind turbines use, is one of those countries<sup>32</sup>.

Figure 18 Installed renewable energy power in Poland (MW).

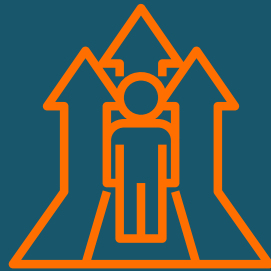


Source: Urząd Regulacji Energetyki.

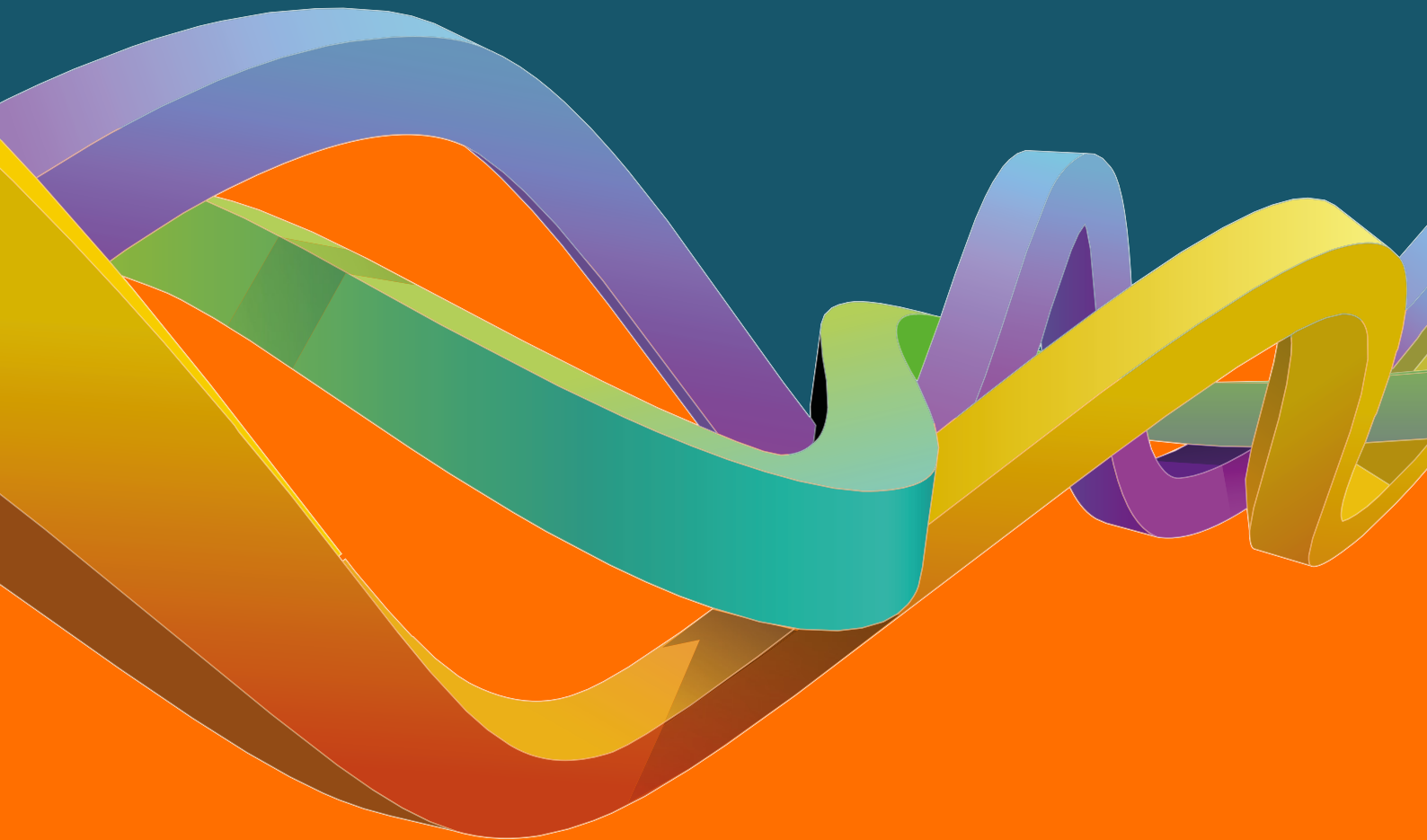
31. International Renewable Energy Agency (2015): REMAP. Renewable Energy Prospects for Poland.

32. Marks-Bielska et al. (2020): The Importance of Renewable Energy Sources in Poland's Energy Mix.

# chapter 3



## Identifying most promising sectors for circularity development in Poland



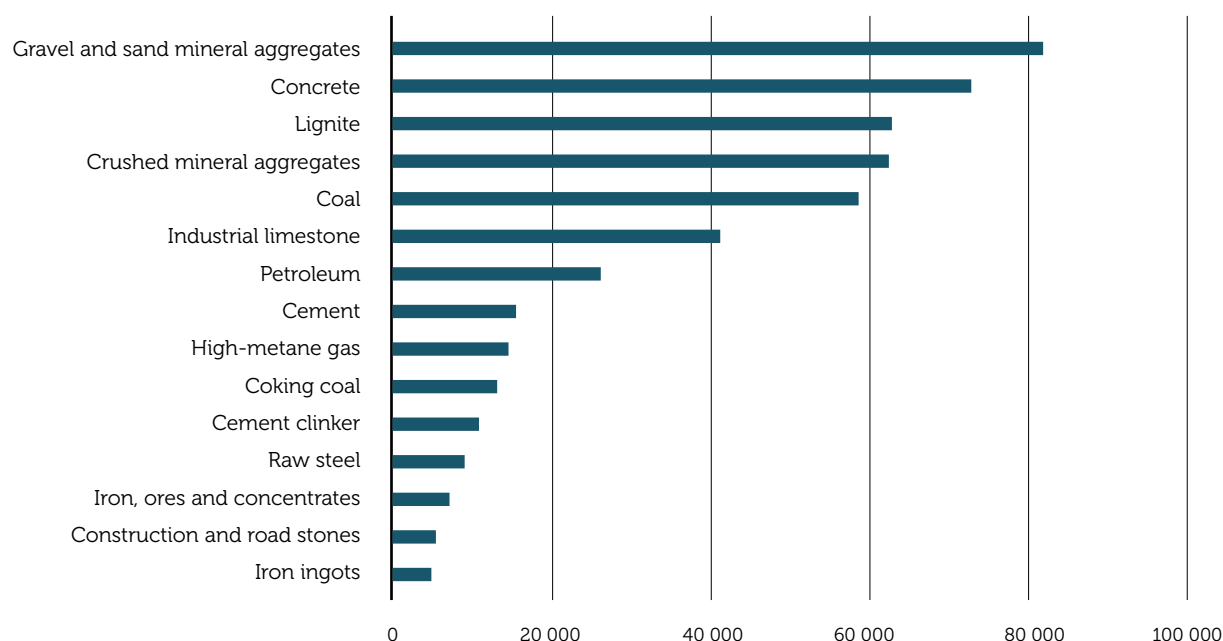
### 3.1 Prioritization criteria

There are many factors that should be taken into account when selecting priority sectors for the implementation of circular economy. The most important measurable criteria for choosing sectors with the highest circularity potential are:

- **Raw materials' use**

Raw materials used in construction (aggregates, concrete, industrial limestone) and energy resources (coal, petroleum, gas) are characterized by the highest consumption.

Figure 19 Use of raw materials in Poland in 2015, for materials with over 5000T used (in thousand tonnes).

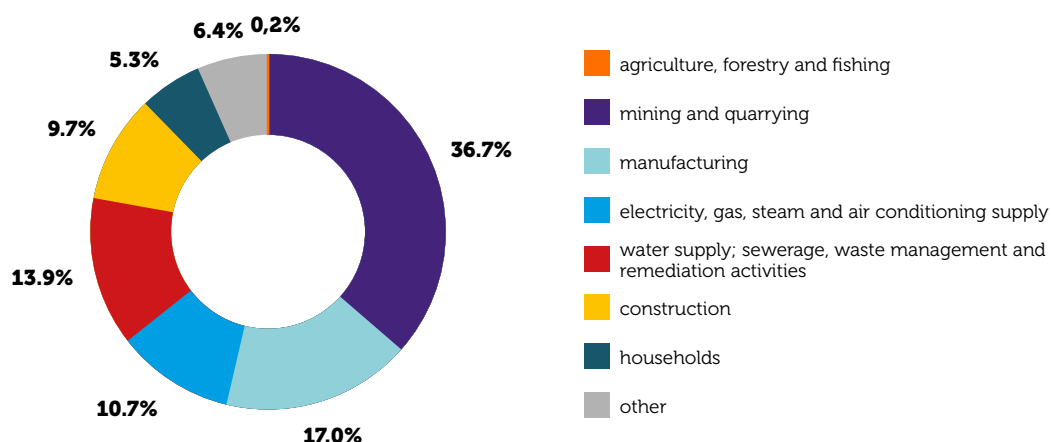


Source: KPRM (2018): Polityka Surowcowa Państwa.

- **Waste generated**

The consumption of raw materials is directly related to the amount of waste generated. Therefore, it is no surprise that the primary sources of waste are mining, energy and construction industries. The manufacturing industry is an important source of waste, however it is highly heterogenic.

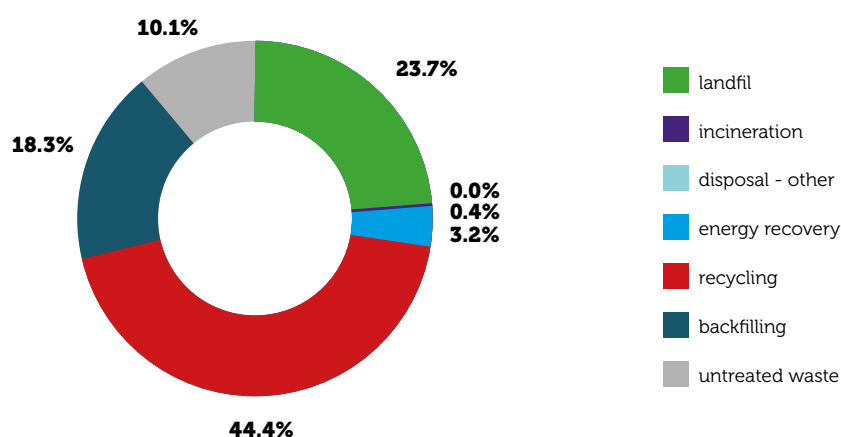
Figure 20 Generation of waste in Poland by sector in 2018, calculated by waste mass.



Source: Eurostat.

The amount of waste generated by certain sectors only shows a crude picture of the current state. The way waste is managed is also extremely significant. This particularly concerns municipal waste. Currently the municipal waste system in Poland obliges citizens to segregate waste into five fractions - paper, glass, plastic and metal, biowaste and mixed waste. However the effectiveness and quality of segregation is, to a large extent low. In 2018, selective collection reached 28.9% of the total amount of municipal waste generated<sup>33</sup>. In effect, there is still an insufficient supply of recyclate for the domestic economy. It seems that a deposit system for plastic, possibly also metal and glass, packaging could effectively supplement the current system. Such a system could be indispensable in the light of rising requirements at the European level<sup>34</sup>. Alternatively, a considerable rise in the awareness of citizens is necessary for the recycling operations to gain momentum.

Figure 21 Treatment of waste in Poland in 2018, calculated by waste mass.



Source: Eurostat.

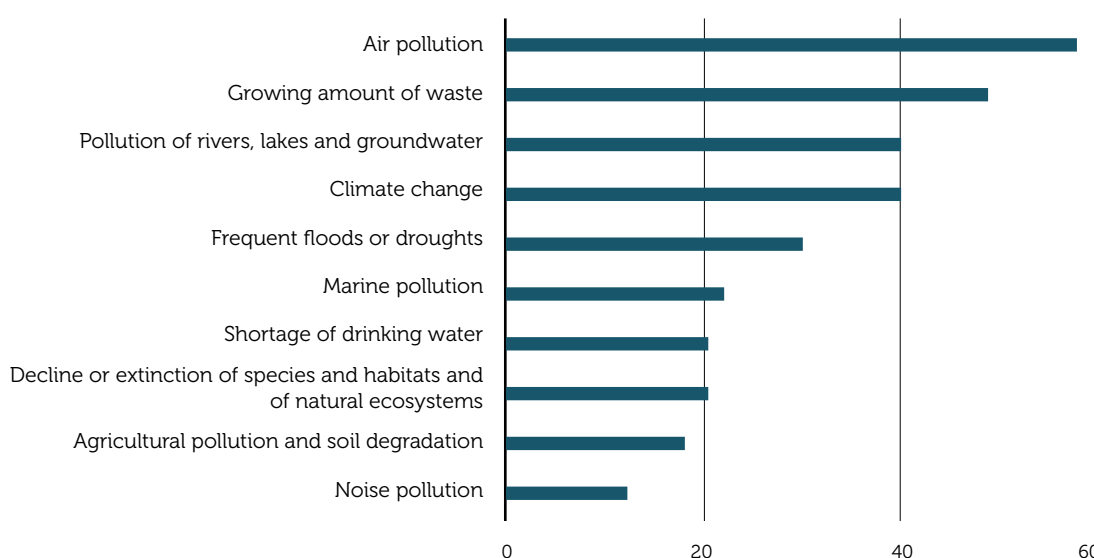
33. Smol et al. (2020): Transformation towards Circular Economy (CE) in Municipal Waste Management System: Model Solutions for Poland

34. European Commission (2018): A European strategy for plastics in a circular economy.

### • Social will

Currently, more and more Poles notice the negative effects of unsustainable production and consumption, and thus the consequences of a linear economic model. This provides the basis for social and consumer actions towards transitioning to a circular economic model. Poles believe that the greatest environmental threat is air pollution. This is, first of all, the consequence of burning fossil fuels, which itself is related to the energy sector and to the built environment (obsolete heating stoves are the main culprit causing air pollution in Poland). The second and third positions are taken by the growing amount of waste and the resulting pollution, while climate change occupies the fourth spot among most pressing environmental concerns.

Figure 22 Main environmental concerns in Poland (maximum four answers were possible)



Source: European Commission (2020): Attitudes of European citizens towards the Environment.

### • Political will

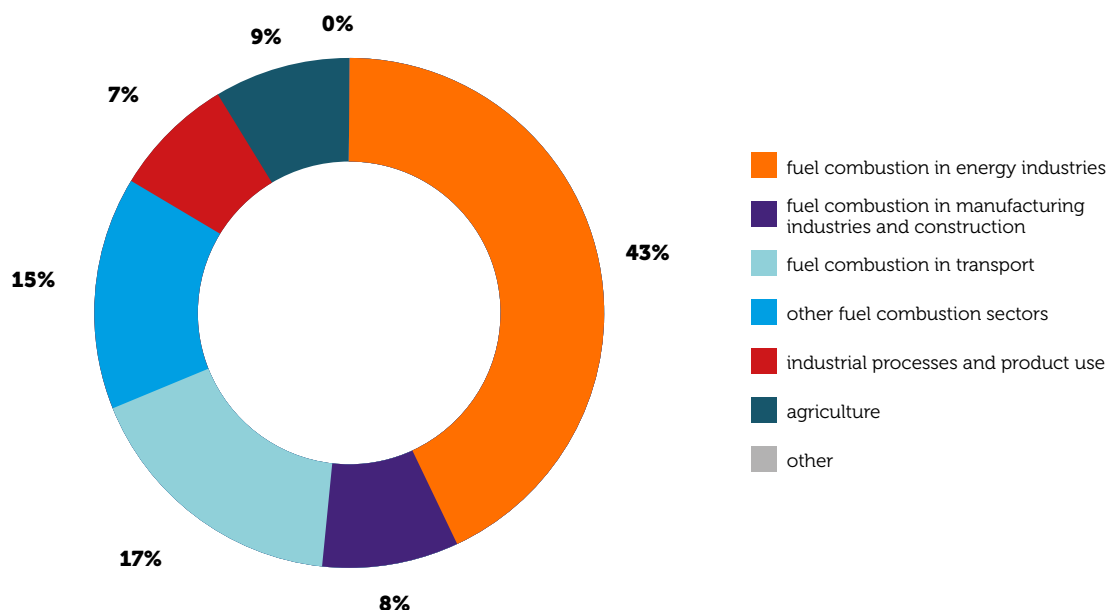
The existing political will is the unquestionable criterion for selecting the priority sectors for the circular transformation of the Polish economy. Bioeconomy was the only sector prioritized in the Polish Roadmap towards circular economy, which should be interpreted as a clear will to pursue changes in this area expressed by public authorities.

### • Environmental effects

Greenhouse gas emission is one of the basic indicators of environmental externalities. The primary source of greenhouse gas emissions in Poland is the generation of electricity and heat. It should be noted that this applies not only to the energy industry, but also to the built environment, which is the most important user of generated energy. The agricultural sector is also a large emitter of greenhouse gas, but taking into account the entire bioeconomy sector, it should be said that the industry contributes to the net decrease in the amount of greenhouse gases in the economy.



Figure 23 Greenhouse gas emissions by source sector in Poland in 2018



Source: Eurostat.

### 3.2 Promising sectors identified and Dutch stance on chosen sectors

Sectors with highest possibility of circular economy development in Poland

Dutch perspective on chosen sectors



#### Bioeconomy

The choice of the sector is dictated primarily by the political will to support circular transition, expressed by public authorities. It seems that current global processes, specifically increase in global trade, will push changes in the agricultural sector in Poland even without regulators' specific interest. Increasing productivity is essential in this aspect. Circular solutions could be of great help in this aspect. Especially, that the desire to intensify cultivation, characterized by, inter alia, excessive consumption of fertilizers and the introduction of monocultures, poses a great threat to the quality of life of people, mainly due to the deterioration of the quality of the environment in which they exist. The concept of circular economy could help to curtail these externalities, without limiting the possible competitiveness growth, or rather supporting it in a new environment of more sustainable consumer choices.

It is beyond doubt, that the Dutch bioeconomy sector is one of the leaders, when it comes to competitiveness. Nowadays the push towards circularity has put Netherlands on the forefront of sustainable agriculture as well. The technologies that enable this transition could be replicated in Poland to increase the sectors productivity and at the same time answer the needs of ecologically-aware consumers. To do so business environment modification would be helpful.

Poland has relatively vast areas of arable land. Most of the farms are small in size and use relatively old methods of production, characterised by 'respect towards resources'. This offers the possibility of using current farms as a blank slate, for applying circular solutions.

## Energy generation



The energy sector has been one of the main sources of environmental pollution. It ranks third in terms of the amount of generated waste in Poland. In addition, its activity is associated with negative externalities, especially significant greenhouse gas emissions resulting from the composition of energy sources. Most of the energy consumed in Poland is produced from fossil fuels, with still a small amount of energy from renewable sources, although this indicator has improved significantly in recent years. It seems that the Polish consumer at last realized that environmentally-friendly choices could be economically viable. The momentum for changing Poland's energy composition could be actively supported by circular businesses, products and services they offer.

Dutch renewable energy companies could easily find their consumers on a growing Polish market. This concerns both individual clients as well as farms and production companies that are willing to invest in sustainable energy to both, increase their energy efficiency and limit negative environmental effects. In particular, specific technologies tailor made, e.g. for horticultural production, logistics, could be an essential area in which Dutch entrepreneurs could be successful.

## Built environment (including furniture production)



The construction sector is currently responsible for the greatest environmental damage among all sectors of the economy in the European Union and in the world. In Poland, the situation is slightly different, at least when waste generation is concerned. Construction industry is responsible for three times less waste generation in the total amount of generated waste, compared to the statistics for the entire European Union. However information on construction waste in Poland is of questionable quality. Data on raw materials use have actually implied that the importance of the built environment is essential in this aspect. The same applies to greenhouse gas emissions, especially taking into account that energy generation is mostly used for heating buildings. Furthermore, the most pressing environmental issue, according to Poles, i.e. air pollution, has originates from obsolete heating appliances.

One cannot neglect the relative simplicity of implementing circular economy model in the construction sector. Features of buildings and structures, such as durability, the possibility of modernization and reuse predispose them to apply circular concepts – closing economic loops, so that the goods circulate as long as possible with simultaneous value maximization.

One of the branches of built economy that is essential for the sectors exports, i.e. furniture production has not adopted circular concepts yet. Judging by the current trends on the global markets, such actions will be indispensable.

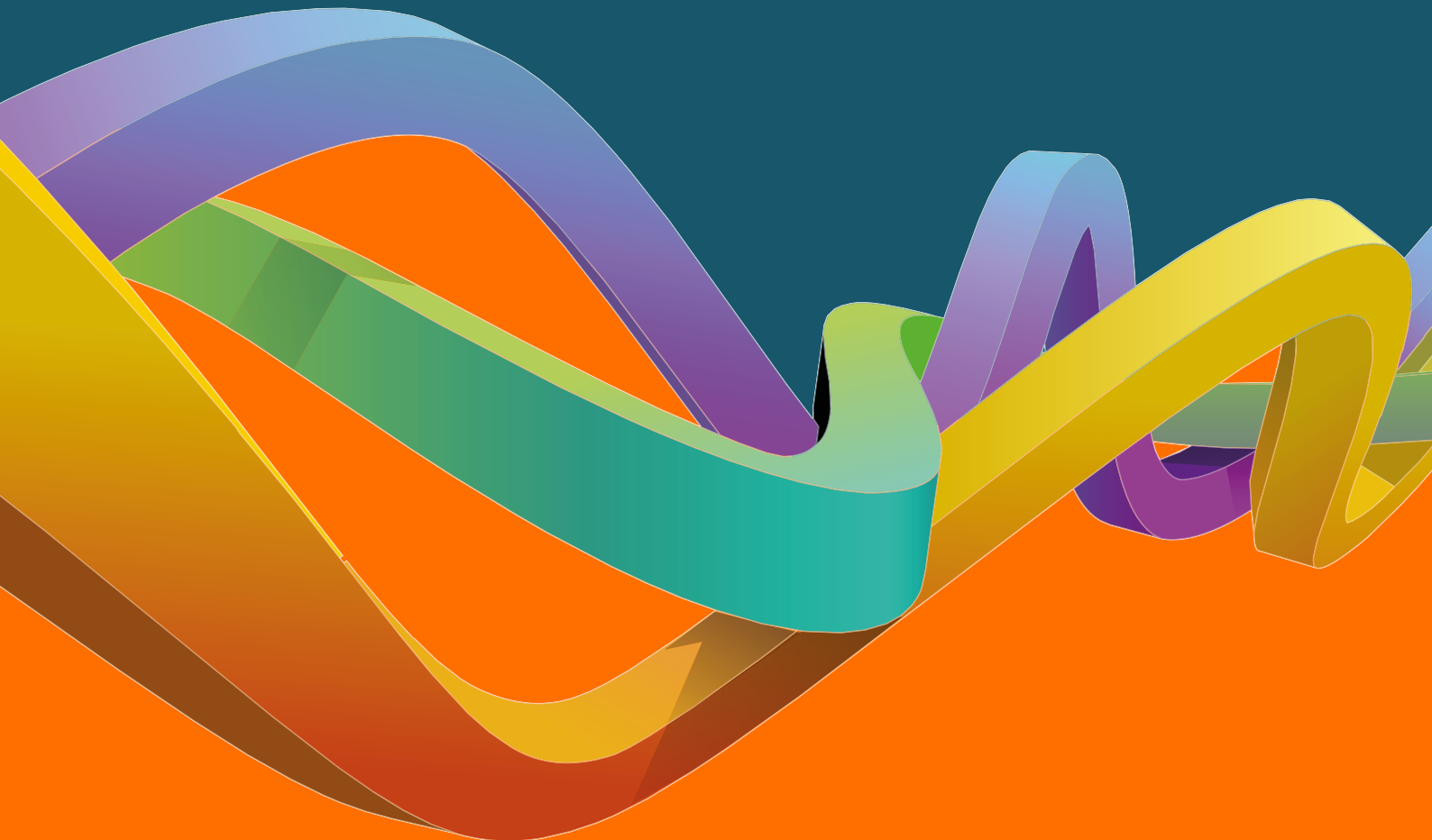
The built environment has shown relatively little technical progress in recent decades, especially when construction techniques are concerned. Therefore, although this branch is predisposed to circular transition like no other, the push towards a circular economic model has to be an outcome of more sustainable entrepreneurs' decisions. Therefore built environment in Poland is a ripe sector for investment, but mostly in the form of accompanying services, and not contracting activities per se. Such services are actually the key asset of Dutch companies active in the built environment, as they take on e.g. construction digitalization, new materials development, architectural design.

One crucial element of the built environment that could specifically benefit from Dutch entrepreneurs and their circular expertise is furniture production. Currently Poland is one of the biggest exporters of furniture in Europe and the whole world. Recently established Dutch companies in the area of circular furniture, could make use of a developed business environment, high production capacity and ability to adapt that is visible on the Polish furniture production market. Additionally, Dutch design and experience in creative goods production could further enhance the possibility of success for investment in circular furniture production in Poland.

# chapter 4



## **Circular opportunities in the bioeconomy area and market entry factors**

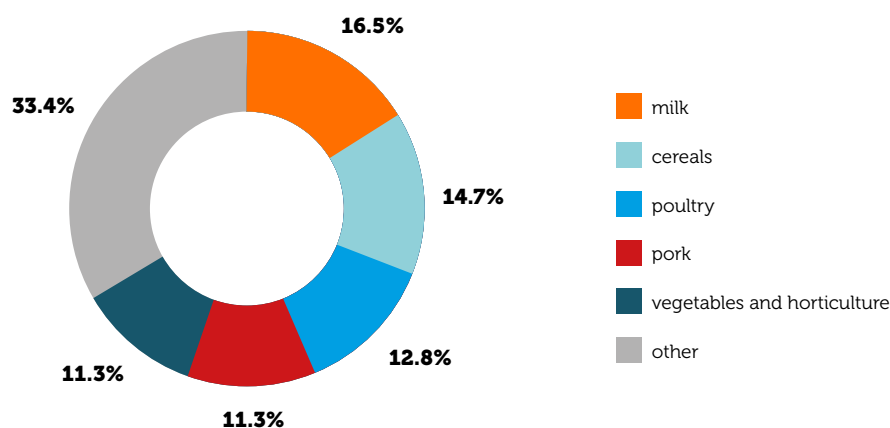


## 4.1 Circular business opportunities

### • Eco-friendly and organic food production

Poland has more advantages than any other country for becoming Europe's major food production and processing hub. The country has the fourth-largest area of arable land in the European Union, after France, Spain, and Germany. 200 million EU citizens live within 1,000 kilometres of Poland's borders. Furthermore, a sizeable portion of the country is less industrialized, which could be a terrific starting point for production of eco-friendly and organic foods, possibly with the aim of exporting it to environmentally-aware Western European consumers.

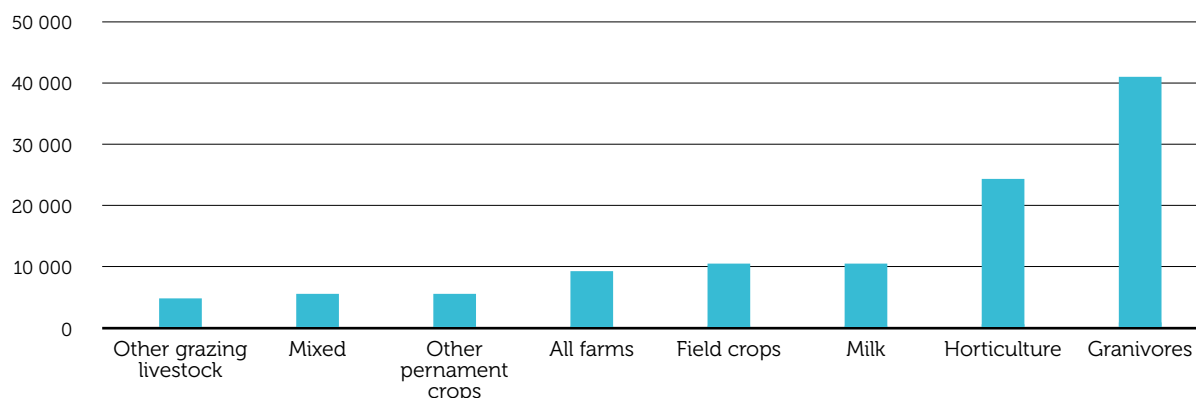
Figure 24 Agricultural output composition in Poland in 2017.



Source: European Commission, 2019, Statistical Factsheet Poland.

Entrepreneurs willing to realize this potential should consider sub-sectors that already are the top performers. As most of the agricultural production is under-invested, thus inefficient, the top sub-sectors could be identified based on investments made. The highest liabilities concern poultry, horticulture and milk production. Production in those sub-sectors has already taken the path of higher sustainability, which means that conditions for such business activities are already present.

Figure 25 Liabilities by type of farming in Poland, EUR per farm, 2017



Source: European Commission (2020): Financial needs in the agriculture and agri-food sectors in Poland.

The poultry subsector has the highest liabilities, reflecting increasing demand for financing over the same time period. This is due to poultry producers having significantly expanded their levels of production in recent years due to demand from the EU where poultry is one of Poland's key export products. New non-EU markets were also discovered. However, production is often aimed at achieving lowest prices possible without caring for externalities. Recently it seems that Polish consumers took the path of Western Europeans and are buying more sustainable food products. This concerns poultry as well, with organic meat offering, enabled by ecologically-oriented subcontractors and infrastructure that has sprouted in recent years.

The second highest level of liabilities are to be found in the horticulture sector, where Poland plays a leading role in the EU for crops such as apples. The comparatively high amount of medium and long-term liabilities is related to the fact that many farmers have made investments to adjust to new planting technologies, new varieties of fruit trees or new after-harvest technologies. In result, during the last decade, production has become more intensive without putting much interest into externalities that came with this process. Persisting changes in weather patterns and environmental challenges, like soil erosion and soil degradation, require farmers to invest in technologies to protect their perennial crops, thus a growing need for circular horticultural production has emerged<sup>35</sup>.

The milk sub-sector has the third highest level of liabilities and produces 174% of the total agriculture output and is expanding consistently. However, production typically leaves a considerable environmental footprint, while the economic loops have not been closed, e.g. by-products are not used to a full extent. Dutch entrepreneurs could offer to fill this gap. In recent years, the sector has seen a significant decrease in sale price of products (mainly due to the Russian embargo). Margins have also decreased due to rising production costs (mostly labour costs). There is a large need to introduce new technologies, such as milking machines and other types of supporting equipment, to increase the quality of milk and decrease labour costs.

The main regions that should be considered for these types of business activities are e.g. Warmia and Mazury, Podkarpackie, Lubelskie, Świętokrzyskie and Podlaskie Voivodeship. These under-invested regions could be a blank slate, that could enable ecological agricultural production.

Go Agri BIO is an ongoing programme led by Social Ecological Institute (Społeczny Instytut Ekologiczny). The project is intended for farmers who would like to undergo a full conversion process to organic farming and get an organic farming certificate. The project provides substantive support (training, mentoring) and financial support (for machines, seeds, documentation, etc.). The aim of the initiative is to promote organic farming in Poland. The activities under this initiative are usually financed by grants from the Carrefour Foundation, which equalled nearly 185,000 EUR so far.



35. International Resource Panel (2019): Natural Resource Use in Poland.

### • Biogas plants and biorefineries

With a considerable size of the arable land and feedstock in Poland, coupled with the country being a net energy importer, thriving biogas sector could be a possible route for assuring appropriate energy mix in the country. It can become an element of the development of circular economy, allowing the transformation of significant amounts of agricultural waste into valuable raw material.

The raw materials used for the production of biogas are maize silage, slurry and manure. However, due to the need to reduce costs related to the operation of biogas plants, newer substrates with high energy efficiency and low acquisition costs are sought. Such a solution that meets the above criteria is the use of inexhaustible (expired) food and waste from agricultural and food production<sup>36</sup>.

Polish rural areas have significant biomass availability, e.g. forest biomass, agricultural residues, show potential for biogas production, with the aim of renewable heating and off-grid/mini-grid power technologies for instance in district heating, local industry and agricultural and horticultural applications such as greenhouses. There is also some interest in liquid biofuels for transport applications such as tractors. The highest potential for such solutions exists in remote locations with poor grid access. They could be suitable for the sparsely populated regions of eastern Poland where biomass potential is high and grid coverage is low.

Currently organic waste (liquid manure, distillery stock and other agricultural waste) is a major source of agricultural biogas in western, north-western and northern Poland. Farms located in those areas, specialising in livestock production, are able to provide an adequate supply production residues. In other parts of the country such specialization is non-existent, therefore material collection systems are necessary.

Ensuring affordable and sustainable fuel supply chains is the main challenge to bioenergy development. This includes collection, sorting, pre-processing and logistics. Large storage capacity will be required to ensure security of feedstock supply and transportation over long distances will increase biomass prices which is already one of the challenges the biomass sector is facing today.

However, according to some estimates<sup>37</sup>, the current installed capacity is only 16% of current capacity, meaning there is potential for the sector to grow sixfold if all waste feedstocks become available and opportunities are taken from energy crops and crop residues. Additionally, there are no known plants that upgrade biogas to biomethane in Poland<sup>38</sup>. This could also be a profitable avenue for business.

36. Chodkowska-Miszczyk, Szymańska (2013): Agricultural biogas plants – A Chance for diversification of agriculture in Poland.

37. Flanders Investment & Trade Market Survey (2020): Renewable Energy in Poland.

38. Biorefinery orlen <https://www.orlen.pl/PL/BiuroPrasowe/Strony/PKN-ORLEN-stawia-na-biorafineri%C4%99-nowej-generacji.aspx>

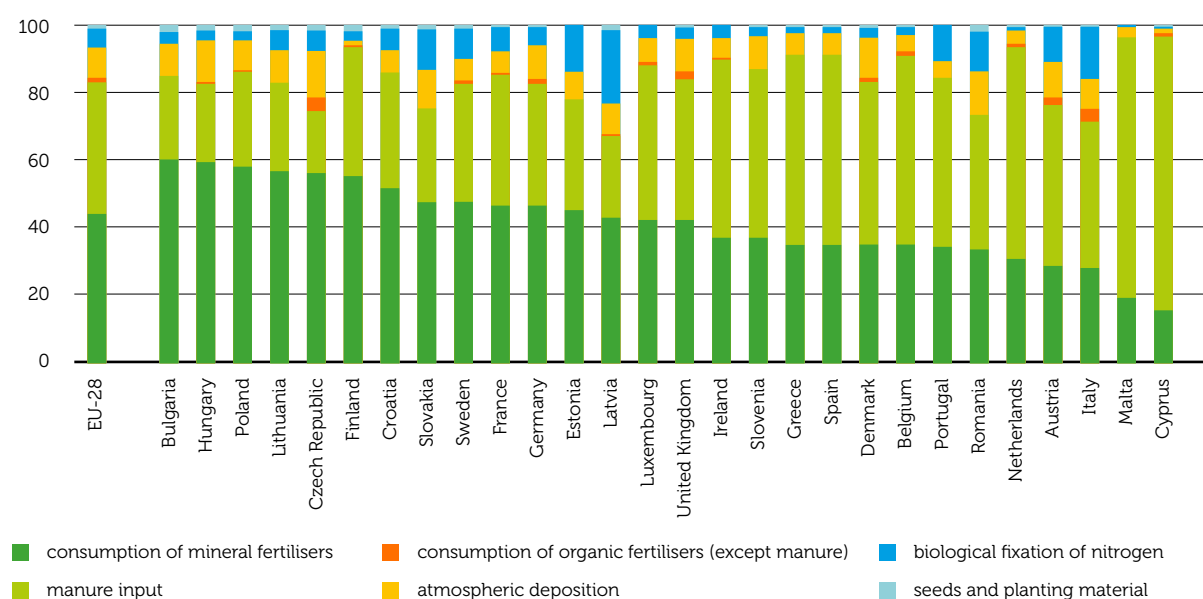
Spółdzielnia Nasza Energia is a cooperative that intends to build 15 biogas plants, which will provide the municipalities of Sitno, Skierbieszów, Komarów-Osada and Łabuń with energy self-sufficiency. The concept of the project, due to the unique agrarian conditions in Eastern Poland, is based on building an integrated network of agricultural biogas plants. The task is to supply electricity and energy for public buildings and households. The cooperative assumes that the entire first stage of the investment requires financial outlays of 33.4 million EUR, with a minimum of 6.7 million EUR coming from the cooperative's own resources, for example from the business income, and the rest would be covered by subsidies and commercial loans.



### • Sustainable soil management and organic fertilization

In Poland, there is a considerable unmet need for more sustainable agricultural production through optimized soil management and sustainable fertilisation<sup>39</sup>. This process is carried out by large farms run by well educated farmers, mostly in the western parts of Poland. In other regions, sustainable fertilization is non-existent. In result fertilization is often based on mineral fertilizers, while manure is used in unsustainable fashion, causing unwanted externalities to the environment.

Figure 26 Share of the different nitrogen inputs in total nitrogen input, average 2009–14 (%)



Source: Eurostat.

39. Bórawski et al. (2020): Investments in Polish Agriculture: How Production Factors Shape Conditions for Environmental Protection?



This gap could be filled by Dutch companies offering organic fertilizers. They typically collect secondary raw materials, including chicken manure, compost, sugar and biofuel by-products and transform them into high-quality fertilizer. It seems that replicating this business model could also be viable in Poland.

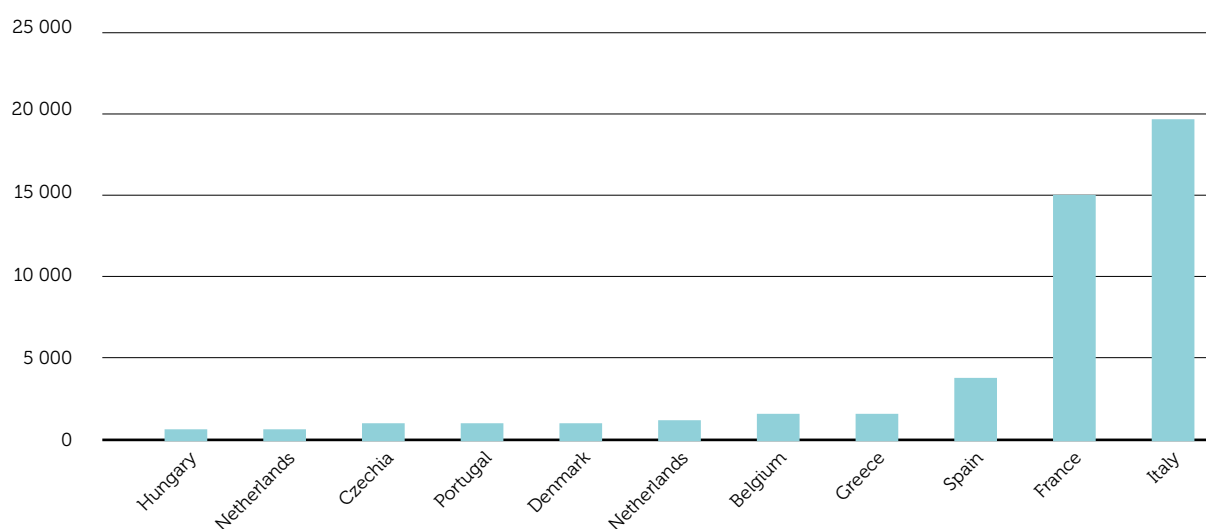
The development of such products and services is also facilitated by new EU regulations. In recent years, the European Commission has launched a fertilizer regulation scheme, which is an element of the circular economy package. The aim of the new law is to facilitate access to the market for fertilizers produced from organic or recycled materials. Furthermore, the Commission wants to introduce strict limits on cadmium that is harmful to health. And it is precisely these restrictions that raise the greatest concerns of the fertilizer industry in Poland and several Member States, including Spain, Portugal, Romania and Ireland.

#### • Services supporting circularity in the bioeconomy area

Due to high fragmentation of farms in Poland there is a huge untapped potential for companies that seek synergies through cooperation. This concerns sustainable agricultural production in particular.

Poland's agriculture and food industry is skewed toward low value-added produce. To process produce additional infrastructure is needed. Cooperation on improving quality, scaling supply for processing activities is possible thanks to vertical integration and clustering. Nowadays, the Polish food-processing industry enjoys very modern production-line infrastructure, only in dairy, meat, frozen food, and beverages sub-sectors. Other areas are virtually void of such infrastructure. Efficiency gain through true cooperation is fundamental. To this end making use of the modern ICT tools, advisory services (that also allow for establishing a relationship with the customer), maintenance of machinery, or help with obtaining EU funding is indispensable. Farmers expect comprehensive services from a single provider.

Figure 27 Number of processors of organic products in chosen countries in 2019 (or latest available data)



Source: Eurostat.



To increase processing contract farming could be used. This arrangement allows processing companies to enrol farmers as suppliers, with prices contractually stipulated. Furthermore, producer cooperatives could be also applied. Producer groups enable agricultural producers to integrate horizontally and, while retaining land ownership and a measure of independence, capture some economies of scale. Producer groups enjoy negotiating advantages with processors and receive dedicated subsidies. Group-owned facilities enable increased utilization of labor (by employing farmhands out of season) and adding value by selling produce in all seasons, not solely during harvest time when prices are lowest. To expand their production, Polish farmers need to adopt a different set of international production standards, in terms of quality, size, food safety and packaging requirements, also to be able to enter new markets. This requires investing in farm assets such as, for example, sorting facilities and chilling stations.

The above-mentioned solutions could result in moving production up the value chain with a higher degree of processing, applying innovation to a higher extent and use the competitive advantage of local access to Polish food market.

A separate business model based on a partnership between farmers and consumers are online sales platforms for local, ecological products. For example, platforms for automatic shopping service, local group data management and payment supervision are yet to be utilised to their full potential. Both sides benefit in this model. Farmers and manufacturers get more for their produce by bypassing middlemen and most marketing costs, and buyers buy cheaper. It is also not without significance that in such a system food is not wasted: the farmer does not bear any risk of unsold goods, which are sold and paid in advance.

## 4.2 Barriers to entry

Until 2016 the main barrier for foreign entrepreneurs planning to enter Polish bioeconomy market was the difficulty in acquiring land. Since then, a lot has changed for the better. Arable land up to 300 ha could be bought by individual farmers from all EU states without the need for a separate administrative approval that is obligatory for other foreigners. Still there are some formal requirements that need to be fulfilled in order to purchase agricultural land like knowledge of agriculture or address in the nearest surrounding of the land. Therefore the path for acquiring land for Dutch citizens is similar to those for Polish citizens, albeit this is not a straightforward process.

Other types of administrative approval may be necessary, e.g. for energy production from biogas plants. In such cases the regulatory barriers depend on the energy production capacity, with smaller producers having an easier access to the market<sup>40</sup>.

Cooperation among Polish farmers is very low, e.g. judging by the high number of machinery per farm compared to other EU nations. Therefore forming cooperatives and groups of farmers could prove to be a difficult task, especially as the investor would not be Polish. Trust issues may arise.

Low level of knowledge of farmers could be a significant barrier to the adoption of new, sustainable products, such as organic fertilizers.

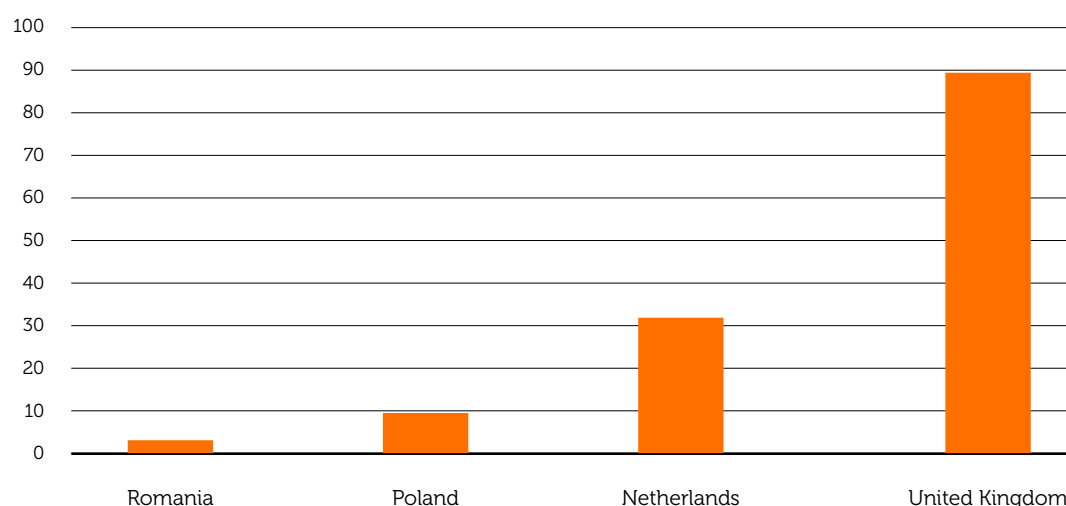
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40. For more information on barriers see Groenestege M. (2020): Bioenergy in rural Poland.

### 4.3 Market competition

The market competition among bioeconomy producers is low. Most farmers produce basic products and do not try to differentiate their offer from their competitors. They typically do not have the means to do so, therefore other market entities, e.g. distributors, are taking over this process and thus collect higher margins. This situation is mainly an effect of low productivity primarily driven by fragmented holdings<sup>41</sup>. The average farm size in Poland is approximately 10,2 hectares, compared with 90,1 hectares in the United Kingdom. Fragmentation is a problem in animal production as well. Any significant improvement in productivity would require increasing the size of an average Polish farm first. However, a vicious cycle of small scale production results in the lack of profits needed to scale up production.

Figure 28 Average size of farms in selected countries, in ha in 2016.



Source: Eurostat.

In case of organic produce, this is typically the domain of larger farms. This does not necessarily mean that the competition on the market is higher, as the market for such products has only started to develop.

Despite favourable natural conditions, Polish companies and farmers have not proved to be competitive on European bioeconomy markets. Three main causes of low competitiveness are:

- Low investments in intellectual property. Polish companies do not invest enough in brand creation. Spending on R&D, cooperation among food-processing companies, and the academic environment is not sufficient to elevate the sector.
- Fragmented sector structure. The sector does not offer a large-enough scale for international expansion.
- Overall lack of international aspiration by Polish companies. While some companies, such as Maspex and Hortex, have managed to build an international presence, most food processing companies still think locally.

41. Wicki (2019): Size vs. effectiveness of agricultural farms.

## 4.4 Financing options

Leasing plays a key role in financing Polish agriculture, with the sector having developed rapidly over the last 20 years. Out of 30 leasing companies operating in Poland, 18 provide financing to the agriculture sector<sup>42</sup>. Leasing is an attractive financing option for Polish farmers because it helps them to address collateral challenges, which are a particular issue for medium and long-term loans.

In case an entity is not an individual farmer but a company, 43 guarantee funds could facilitate access to finance for enterprises dealing in bioeconomy. Public support provided by the Agency for Restructuring and Modernisation of Agriculture is also available. It mainly offers interest subsidies for bank loans and guarantees.

Up-stream and down-stream value chain actors are also providing de-facto loans to farmers, by providing seeds, fertilisers, plant protection products and machinery on credit. These arrangements are similar to working capital loans that are due after harvest. In some cases, these loans are not official, while in other cases they are based on a formalised loan agreements.

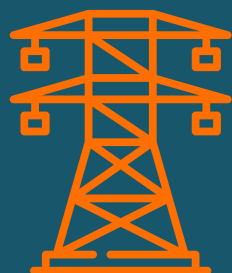
Small farms, that form the majority on the market, have seen a significant unmet demand for finance. This is specifically due to the lack of availability of collateral, weak repayment capacity, limited credit-worthiness, lack of accounting records, and lack of financial and technical knowledge. The rejection rate for long-term loans is significant and around 10%<sup>43</sup>.

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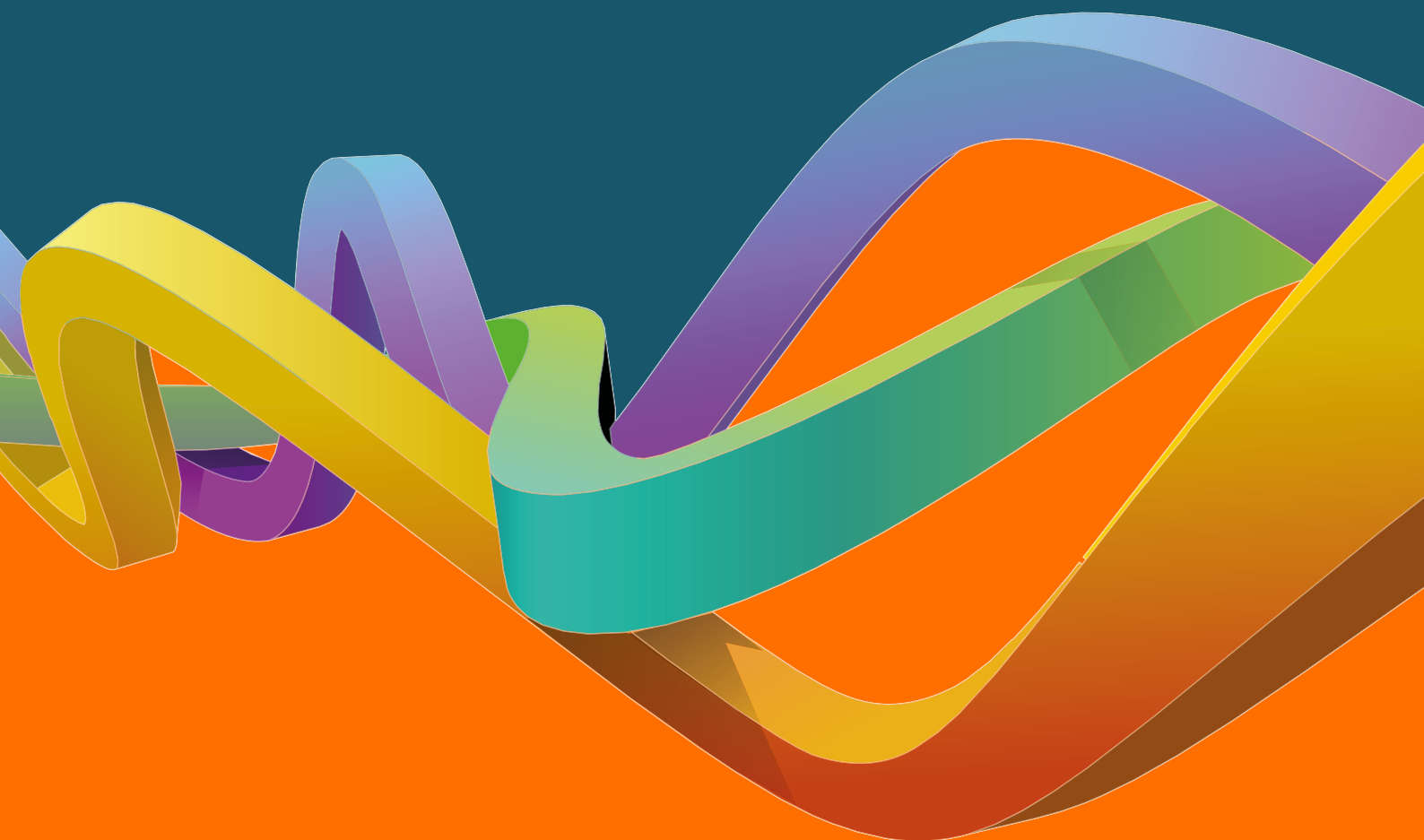
42. European Commission (2020): Financial needs in the agriculture and agri-food sectors in Poland.

43. Ibidem.

# chapter 5



## **Circular opportunities in the energy sector and market entry factors**



## 5.1 Circular opportunities

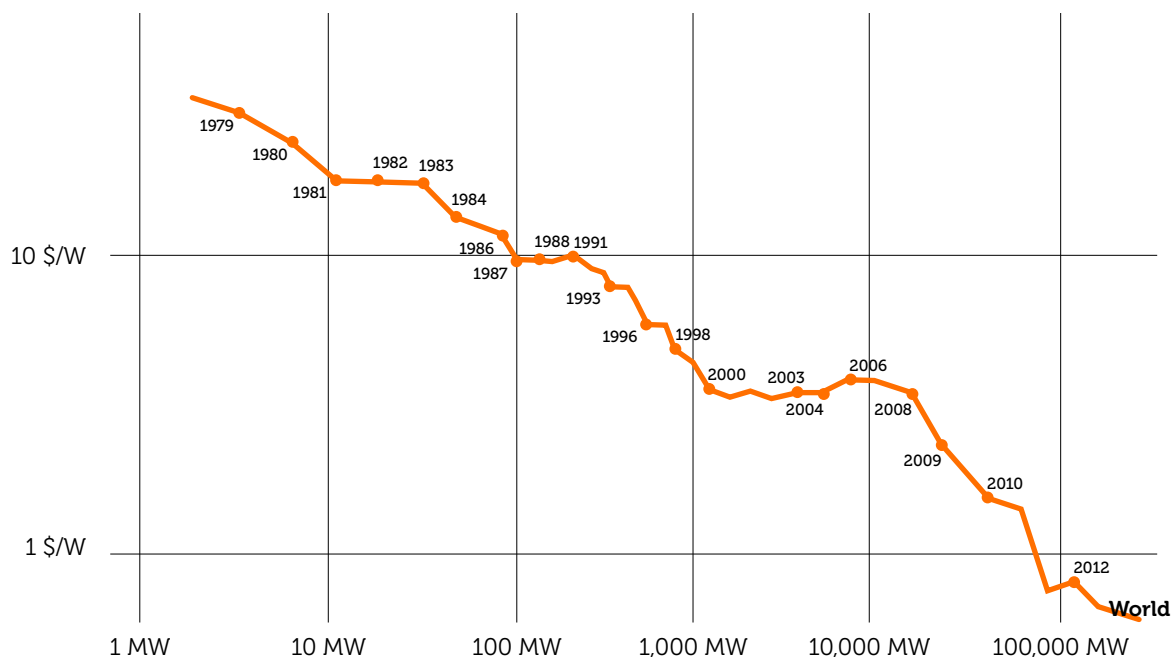
### • Photovoltaics

According to the assumptions of the National Plan for Energy and Climate for 2021-2030 (2019), the share of energy from renewable sources in the national mix is to increase from 17.6 percent in 2025 to 21 percent in 2030. The recent boom for photovoltaics application could help achieve this goal.

Photovoltaics is one of the fastest growing segments of the renewable energy sector in Poland. As of the first quarter of 2020, the capacity of photovoltaic installations according to URE (Energy Regulatory Office) in Poland was 708 MW, representing an increase of 481.6 percent in just two years. This success was the result of four major events:

- Significant decrease in the prices for PV system modules and elements.
- Growing electricity prices.
- Extensive Polish government programmes supporting small initiatives (e.g. thermo-modernization and My Electricity programmes).
- URE auctions for large entities.

Figure 29 Cost and installed capacity of photovoltaic energy in the world.



Source: IRENA, SolarServer data.

Rapid development of photovoltaics, especially in terms of micro installation for prosumer, will most possibly continue in the upcoming decade. Entrepreneurs from the Netherlands could try to take a chunk of this growing market, especially by utilising circular business models that have not been present in Poland yet. Such companies could provide access to energy instead of the ownership of the

photovoltaic installation. This way, suppliers have an additional incentive to create the most durable products that can then be rented repeatedly. At the same time, the burden of maintenance, and additional services needed, will be taken off consumers. To make this model work establishing trust, is essential.

#### • Wind: onshore and offshore

Poland plans to increase its renewable power capacity by 65% from 2019 to 2024, mostly from wind farms. In 2020 63,7% of all renewable energy in the country was produced using wind. However in 2016 Poland's onshore wind generation capacity development was restricted, when a so called 10H bill making it illegal to build turbines within a distance smaller than 10 times tip height of other buildings or forests was enacted. Since then, the government has made plans to revise parts of the bill that hindered wind energy development and created a number of investment disputes between Poland and international companies. Until the restrictions are revisited, offshore wind energy is the main route companies interested in the market could take. Offshore offers better wind speeds than onshore wind, future highly efficient wind technologies (e.g., through taller turbines) could further improve its cost-effectiveness. However this option requires high investments - approximately twice as high as onshore wind energy production. However the risks concerning such projects success could be assessed as minuscule, as the demand for renewable energy is constantly rising. The Polish Wind Energy Association (PSEW) estimates that the Polish energy system will require 1,000MW of newly installed wind energy capacity each year to comply with EU targets. Therefore investments in offshore wind farms are carried out by big energy companies such as the Polish Energy Group, PKN Orlen. Dutch companies may join the market as well.

In case the 10H rule is lifted, which is highly probable in upcoming years, additional option for the engagement of Dutch energy companies in Poland may arise. This concerns prosumers and bigger farms in particular, which could generate their own energy, off-grid. Together with photovoltaics this could offer a reliable energy mix for individuals<sup>44</sup>.

In February 2021 Polish PGE and Danish Ørsted signed a joint venture agreement aiming to construct two Offshore Wind Farms on the Baltic Sea with a total power of 2,5 GW. The plants are expected to start producing electricity in 2026. Offshore wind farms are generally regarded as a huge opportunity for the Polish energy transformation. Further enterprises such as Orlen, Tauron or Enea also plan to launch their projects in the coming years. These undertakings are widely supported by the Polish government, which sees them as a chance to boost economic growth and promote innovation. According to the plans presented by the Ministry of Climate and Environment, the total power of the Baltic offshore power plants should reach 60 GW in 2030.



44. Polish Electricity Association (2018): The contribution of the Polish energy sector to the implementation of global climate policy.

### • Transmission, distribution and storage

Expanding and upgrading Poland's electricity transmission network is a key element to meet its EU goals of promoting renewable energy sources, improving energy efficiency, and integrating into European transmission networks to a greater extent. From 2019 to 2027, The Polish state-owned transmission system operator PSE plans to expand and modernize the Polish grid, also using financing from the EU. PSE plans to introduce 8 GW of power from offshore wind farms into the system by 2027, as transmission grids to send power from the coast of the Baltic Sea inland are needed. Investments undertaken by distribution system operators for distribution grid expansion, upgrade, automation and cyber-security are also substantial<sup>45</sup>.

These market areas could be accessed by Dutch companies, which are one of the leaders in renewable energy technologies in Europe. Value chain benefits are also present, e.g. ships required for installing and operating wind farms, as well as key elements of wind farms, including towers, turbines and foundations.

As a growing portion of energy sources, namely renewable ones, would depend on atmospheric conditions, this could negatively affect the supply of energy. In order to use the renewable energy potential in a manner which is safe for the system, linking energy sources capacities becomes indispensable. This concerns individual use of renewable energy that could be accompanied by energy storage as well. Wind power production is a terrific example. It is an intermittent energy source – generating lots of power when it is windy, but none at all when the wind speed is insufficient for energy production. This generation profile may not match the shape of demand, so there is a need to increase storage capacity – which could take many forms include 'power-to-x' technologies that use excess wind power and convert it to fuels such as 'green gas' or hydrogen fuel for later use.

The possibility of using hydrogen, particularly for energy storage, is a significant step towards Polish energy transition. Green hydrogen, produced by electrolysis and powered by renewable energy sources, is perceived by recent reports and studies as a cornerstone of this transition. The challenge is to overcome cost barriers deriving from the high cost of investments and the need for the economies of scale. However, more efficient technologies, which we can expect in the near future may provide competitive prices. Poland is developing a dedicated hydrogen strategy (which is due in 2021) to exploit the potential synergies between green hydrogen and offshore wind farms that will be built on the Baltic within the next five years. This actions may further bolster the demand for hydrogen energy related technologies

Renewable energy should promote solutions ensuring maximum availability, with relatively lowest cost of energy generation and satisfying local energy needs. Thus additional technical solutions are needed in the form of co-generation, power plant conversion to heating plants, modernization and expansion of heat and cooling distribution system, and promotion of heat pumps and smart grids. This need is further exacerbated by the transitions towards electric mobility.

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45. Forum for Energy Analysis (2016): Polish power sector riding on the waves of megatrends.

The use of electric vehicles and electric heating would bring its own challenges or intensify those mentioned above. Poland's distribution grids may not be fit to accommodate electric heating and charging for electric vehicles in every home, requiring massive additional demand for such technologies.

In December 2020 a Polish energy enterprise PGE opened its first energy storage facility in Rzepedź as a part of the PGE Electricity Storage Programme. The site uses Tesla Powerpack units to create a capacity of 4,2 MWh. It is the first step in a wider programme of electricity storage planned by PGE. With the advancements in decentralized and renewable energy generation the need for reliable storage methods is increasing. Until 2030 PGE aims to construct energy storing facilities with a total power of at least 800 MW.



## 5.2 Barriers to entry

Most of the energy in Poland comes from fossil fuels, and the amount of energy obtained from renewable sources is still small (although this indicator has clearly improved in recent years, mainly due to wind farms). The prospects for a significant improvement in this situation in the future are uncertain. There is a visible lack of political will to change the energy sector, which is rather aimed at maintaining the current status quo<sup>46</sup>.

Specific barriers to enter the Polish energy sector also exist. An investment in renewable energy is a quite complex and advanced undertaking, from the technical, logistic, economic, legal and linguistic point of view. Depending on the type of energy source (technology, the type of energy generated), the amount as well as the region of location of the future investment, administrative and legal procedures may differ significantly. Each investment requires several permits, decisions and agreements with competent administrative authorities.

The electricity sector is regulated by a licensing regime. Generally a licence is required from the Energy Regulatory Office (URE), which includes an entitlement to sell electricity. All renewable energy generators and all co-generation generators (except agricultural biogas-based generation) require a licence irrespective of the installed capacity, with lower financial barriers for those with installed power below 5MW. A licence is needed to trade electricity unless trading through installations with a voltage below 1kV, owned by the customer or trading on commodity exchanges by brokerage houses.

To obtain a licence, an applicant must demonstrate that it has sufficient funds, possesses the technical capabilities guaranteeing the proper conduct of activities and that its employees have the proper qualifications (as specified by the Energy Law).

46. See: Strategy for Responsible Development until 2020 (with a perspective until 2030); Document adopted by a resolution of the Council of Ministers on February 14, 2017



## 5.3 Market competition

There are a lot of enterprises, both foreign and domestic, investing in renewables in Poland. The most active foreign investors are Vortex, EDP, RWE, E.ON, CEZ, GDF Suez, Mitsui & J.Power, Acciona (wind farms), Dalkia (biomass combustion), Poldanor, AXZON Group (biogas plants). There are also Polish players, e.g. Enea, Energa, Tauron and PGE. Additionally, there are estimated to be more than 200 production companies working for the renewable energy sector.

There is a number of small companies that deal specifically in photovoltaics for prosumers but they typically deal in distribution and installation. There are no known companies that try to implement these technologies in a circular fashion, taking into account the whole life-cycle of the installed equipment.

Hydrogen technologies are still nascent. R&D activities are still ongoing and have not yet produced economically viable production and storage options. Therefore no significant competition is present on the market.

## 5.4 Financing options

European power companies use what is known as a "capital recycling" model. This involves them selling shares in offshore wind farms to raise funds for building new farms. This model is increasingly common due to the interest it attracts from pension funds and financial institutions. Capital recycling allows power companies to focus on their core competencies – planning and constructing offshore wind farms. Offshore wind farm projects are attractive for institutional investors because of their scale, the length of the projects and stable returns. However, to encourage institutional investors to participate in projects during the construction stage, developers must minimize the risks associated with a possible failure of the project.

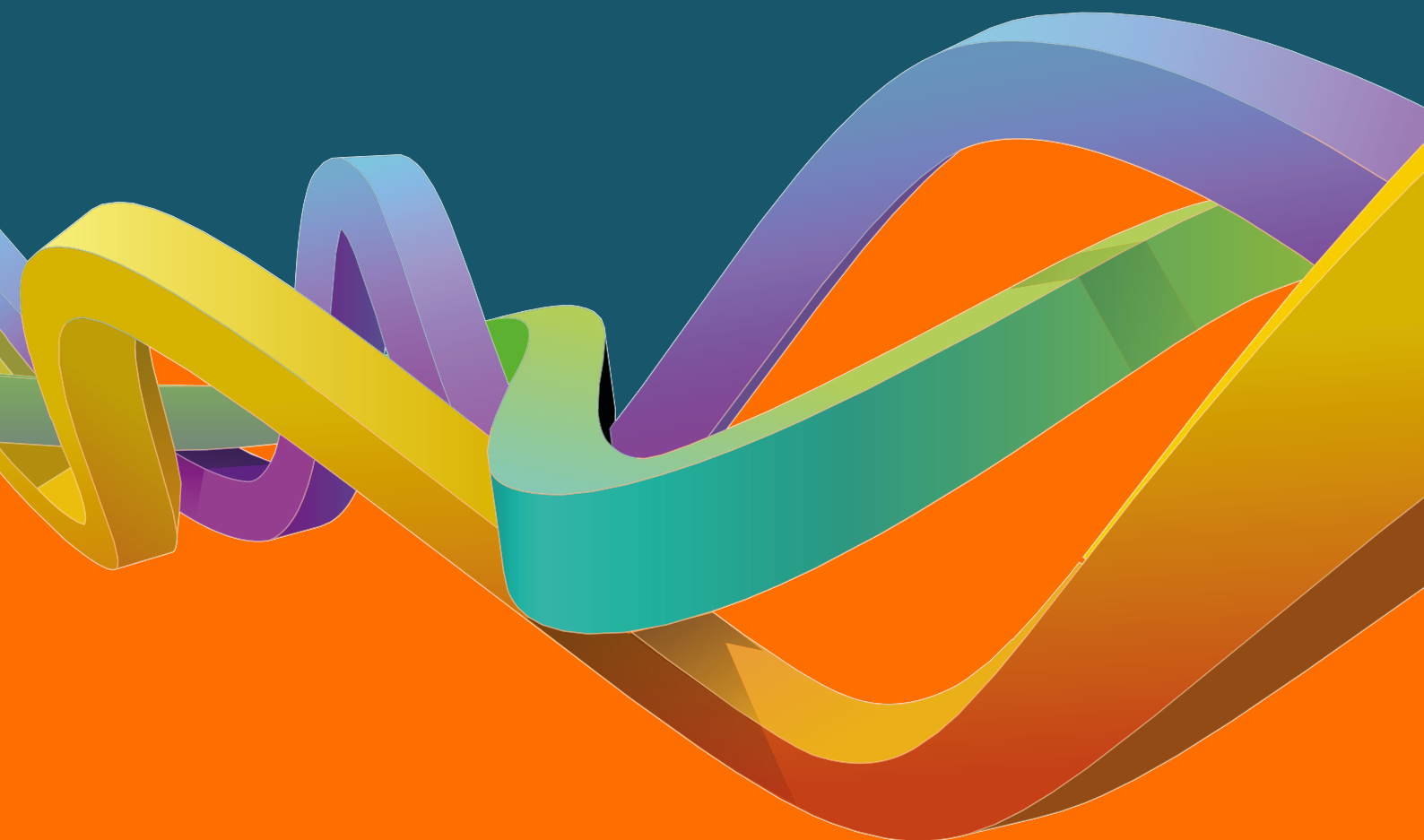
Aid for conventional and renewable energy projects is possible under various structural funds and EU programmes. The Polish Government supports the production of energy from renewable sources with a variety of measures. Investment incentives for producers of renewable energy, in the form of a system of differently coloured certificates are present. Energy companies are obliged to purchase electricity from renewable sources. Renewable energy sources have a priority access to the transmission grid. There are also excise tax exemptions for electric energy from renewable sources. Co-funding investments in clean energy under the National Fund for Environmental Protection and Water Management (NFOŚiGW) are also possible.

Renewable energy laws from April 2015 strongly support prosumer activities. Individual producers of the maximum of 10kW power from a newly installed renewable energy system are guaranteed tariffs for 15 years. For bigger producers, the law introduced an auction system that is a significant source of revenues.

# chapter 6



## **Circular opportunities in the built environment and market entry factors**

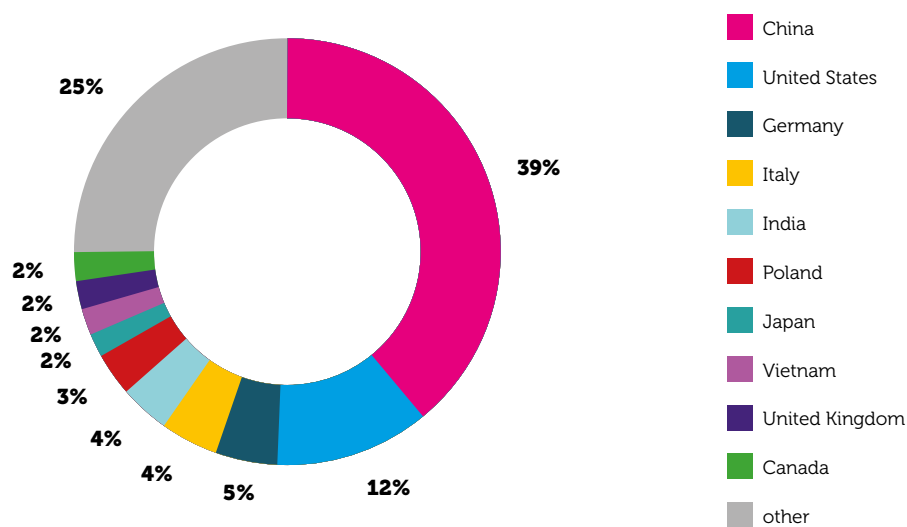


## 6.1 Circular business opportunities

### • Furniture production

Poland has become one of the world's biggest furniture producers, being the 4th global biggest exporter right after China, Germany and Italy. The local consumption trends upward as well, reinforced by the growing purchasing power of the Polish society and the booming Polish construction and real estate sectors.

Figure 30 Furniture production by country in 2016



Source: Centre for Industrial Studies

There is a number of advantages that resulted in the success of Polish companies but could be used also for the development of circular furniture production. These are:

- Favourable location close to both western and eastern markets.
- Relatively low production costs, including labor costs for highly-skilled employees.
- Strong governmental support for the furniture industry as well the availability of various aid funds.
- The proximity to resources of both solid wood and wood-based materials.
- The growing domestic market, driven by the growth of the construction sector and the improving purchasing power of local consumer.

One untapped potential business route that could be taken by Dutch entrepreneurs is to enter repair, refurbishment and remanufacture activities in upmarket furnishing. This would allow for value recovery, while saving on resources and helping the environment. Yet, this will require an adoption of appropriate demand and supply chains. Whilst reuse of furniture is common, this tends to be on a small scale and with local social goals in mind rather than larger scale environmental and economic ones. Currently such actions in the furniture sector are sparse. Their development would require an introduction of better designs and higher quality materials. Going back to solid wood and metal furniture

that does not restrict the potential for a successful second life would be recommended<sup>47</sup>. Availability of spare parts must be assured. Such companies would also have to establish collection and reverse logistics infrastructure, to achieve the economies of scale needed to make repair and refurbishment viable. As of now, furniture recycling lies in the hands of individual consumers, recycling centres which sell other commodities from clothes to tableware and smaller vintage or antique shops.

Beyond product design and manufacture, circular companies in the furniture sector may also innovate to maximize the value of their waste, e.g. sawdust from the manufacturing process could be used for bio-alcohol production, the pulp could be used as filling for cat litter and compost. This cascading use of the various forms of wood by-products can lead to a nearly zero-waste process. One Dutch company developed a long term partnership with a company recovering materials from buildings, allowing it to get access to untapped wood material. A similar arrangement could be made in Poland.

Product customization is a strong feature in circular value proposition of the furniture industry<sup>48</sup>. Associated with product customization, product uniqueness is a common feature in circular furniture value propositions, that has not been present on the Polish market yet. Beyond selling furniture, circular furniture companies often use their sustainability/circularity expertise as an added value to reach customers in need of an improved sustainability impact. Such products could be offered specifically to other ecologically aware individuals and commercial consumers in particular.

#### • Revitalization

The high priority of revitalization in the urban policy in Poland is included in a number of official public documents and is one of the governmental priorities. As of the end of 2018, more than 1 400 municipalities had a revitalization programme (ca. 55% of municipalities in Poland). In 2018 Poland's major cities (Gdańsk, Kraków, Łódź, Poznań, Warsaw, Wrocław). Revitalization programmes covered more than 8.7 thousand hectares of land. The largest proportion of area for revitalization concerned Katowice – 1.4 thousand hectares, which equals 8.5 percent of the total area of the city<sup>49</sup>.

Such areas are drawing more and more interest from commercial companies that are willing to profit from their investment and at the same time build and operate according to circular concepts - using existing resources to the fullest and increasing social cohesion in cities<sup>50</sup>. Entrepreneurs may benefit from revitalization areas occupying whole city blocks, often in prime locations. Some of them are heritage properties of interest for affluent buyers. In such cases reconstruction is typically conducted with building of new parts and facilities. The current proportion of such activities could be vastly improved in terms of circularity. However, these percentages may vary substantially – from 100% of the space located in renovated historical properties in the case of tiny residential and hotel projects, to large mixed use ventures where the percentage of restored floor area drops even below 10%.

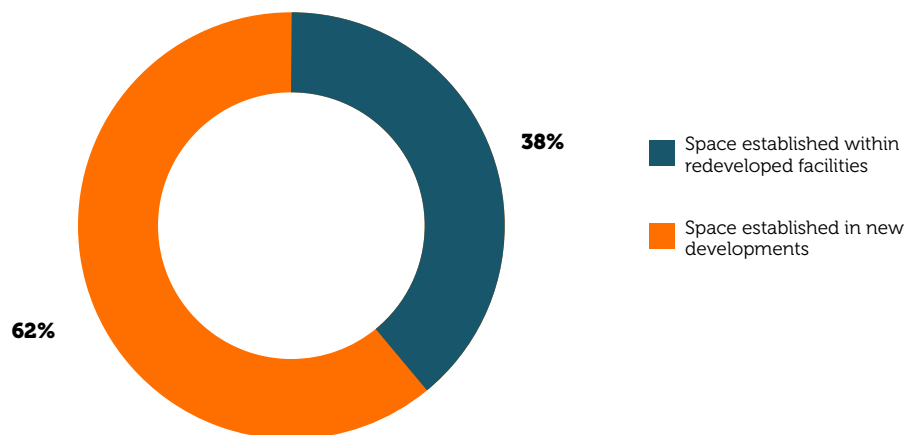
47. European Environmental Bureau (2017): Circular Economy Opportunities in the Furniture Sector.

48. Renda et al. (2015): The EU furniture market situation and a possible furniture products initiative.

49. Bluevine Consulting (2018): Drugie Życie Budynków.

50. Śleszyński et al. (2020): The Contemporary Economic Costs of Spatial Chaos: Evidence from Poland.

Figure 31 Average ratio of new space to historical space in buildings revitalization projects in Poland.



Source: Bluevine Consulting (2018): *Drugie Życie Budynków*.

Currently, projects aimed at revitalization typically do not implement other circular solutions<sup>51</sup>. Dutch companies may fill this gap by offering e.g. higher energy efficiency, lower embodied carbon levels, co-generation technologies or other energy and water efficiency solutions. Areas for commercial use may be most suitable for such application, as companies renting offices are more ecologically-aware than individual clients.

Katowice is a major Polish city located in the southern part of the country. Since the industrial revolution its development has been strongly dependent on coal mining and related industries. The ambitious Katowice Urban Renewal Programme is supposed to serve as the city's answer to the energy transformation of the region. It encompasses about 8,5% of the city's area, which accounts for 23% of its inhabitants. The projects realized within the programme involve waste management, sustainable transport, reducing CO2 emissions and increasing the energy efficiency of buildings.



51. Ministry of Investment and Economic Development (2019): Sustainable urban development in Poland: national urban policy in the context of the 2030 Agenda's Goal 11 and the New Urban Agenda.



### • Solutions increasing effectiveness of buildings' operation

There is a number of solutions used in the built environment to raise resource use efficiency that have not been applied to their full potential in Poland or their implementation has just begun.

The extensive building management system, so-called BMS - Building Management System, which main task is to integrate all installations operating in the building, may verify applied technologies. It is assumed that the use of building automation control systems helps to reduce energy consumption in the building by up to 30%. The investment in advanced control systems in a facility mainly pays off when the building is used. Property managers are provided with adequate tools to control and monitor the set parameters in the installations, whereas the tenants can automatically control the systems tailored to their individual needs. Extensive energy consumption metering, lighting sensors, leakage detection systems are just a few of the solutions that could be offered to the Polish consumer.

The use of water-saving flushing systems, temporary batteries with flow limiters or aerators is becoming a standard in all newly designed facilities, not only the certified ones. The use of high-quality filters in ventilation systems or increased number of air changes offer an improvement of indoor air quality. In addition, the use of low-emission materials e.g. paints, adhesives and wood-based materials, decreases the harmful effects of volatile organic compounds on the respiratory system.

Building Information Modeling, as well as material passports and data repositories support the reuse of materials and construction parts. Increasing the use of modular construction and treating the structure as the sum of its layers (shearing layers concept) is also economically favourable. This allows for a more complete recovery of materials and parts, and thus for closing economic circuits, which so far has only been done to a small extent<sup>52</sup>. Such actions need expertise and planning, whereas Dutch architects and technology providers are on the forefront of circular solutions in construction in Europe.



52. An example of such an undertaking is the PolyStyrene Loop Project with a facility in the Netherlands. The technology of which allows for recycling, depolymerization and separation of the harmful additive in EPS (plastic used for building insulation). See: <https://polystyreneloop.org/>.

## 6.2 Barriers to entry

Currently, barriers to enter the built environment market in Poland depend considerably on the type of business activity. Furniture production is typically an area where entering the market is quite simple, whereas the market infrastructure is developed and robust.

Building construction typically is hindered by bureaucracy and red tape. The permission to build is often difficult to acquire, while in bigger cities, some land ownership issues may arise. This also concerns some heritage buildings in need of revitalization.

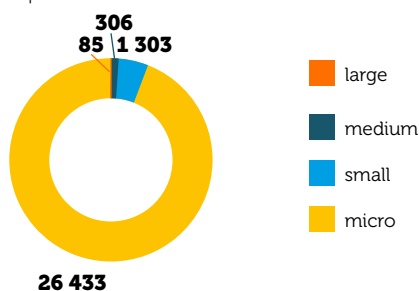
When it comes to building technologies, they have to be compliant with EU laws. Thus, no significant barriers are in place. However these depend on the type of offerings, e.g. energy appliances need to have specific certificates.

Dealing with reclaimed materials is also difficult as current regulations are adapted in line with a linear economic model, not a circular one. Therefore reusing material or incorporating the reclaimed material into a new product may be burdensome from the regulatory perspective.

## 6.3 Market competition

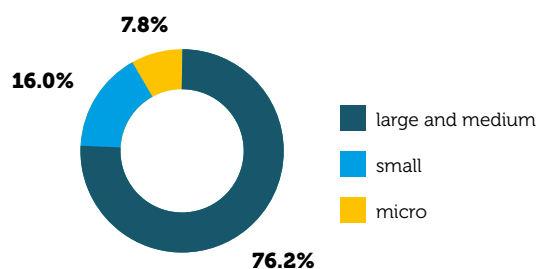
There are currently over 27,000 Polish companies involved in furniture manufacturing. 407 large and medium-sized enterprises account for three quarters of the production. However not many of them try to incorporate circular concepts in their production processes or products.

Figure 32 Number of furniture production companies in Poland in 2018



Source: B+R Studio data

Figure 33 Sold production composition of Polish furniture sector in 2017



In many cases large production companies in Poland took the role of subcontractor for global corporations, e.g. Poland is the second largest supplier of furniture to Ikea after China. Such corporations try to implement some circular solutions, such as material reuse. Therefore some circular furniture production takes place, but there are few companies dealing in circular furniture as their core production. The leading Polish companies in the furniture industry (BRW, Nowy Styl, Szynaka, Wojcik), typically do not implement circular concepts in their production.

Though many revitalization activities have already been carried out, the supply of areas for revitalization is still far bigger than the demand from entrepreneurs interested in such practices.

## 6.4 Financing options

Polish built environment companies finance themselves mostly through banks, trade credit and, when it comes to small and micro companies, informal sources. However, compared to other industries, the construction sector faces greater difficulties in accessing finance. Banks may perceive construction companies as risky. The construction sector is among the poorest performing in terms of the quality of loans. The share of non-performing loans in the building sector amounted to 16,6% by the end of 2019, which is the third highest number<sup>53</sup>. However, this indicator has improved considerably, as in 2015 it reached over 25%. This improvement is a result of greater demand on the market and rising prices.

There is a number of financing options for revitalization projects<sup>54</sup>. One of the main financial sources for revitalization activities in Poland are currently European Union funds. The Partnership Agreement for 2014-2020 lists revitalization as one of the five so-called strategic intervention areas. 2021-2027 financial framework could follow these steps, however this has not been explicitly decided yet. Revitalization projects are co-financed from regional and national operational programmes. JESSICA2 financing vehicle is a good example of a national financing tool for such activities. It allows for the use of EU structural funds in a repayable system, i.e. with loans, guarantees, giving the opportunity to better utilise structural funds and attract financial institutions, banks and entrepreneurs, inter alia through public-private partnership. The vehicle's interest rate depends on energy efficiency, while the loan repayment period may be up to 20 years.

Other direct and indirect innovative channels and financial instruments for circular built environment include:

- direct finance, including debt, equity or quasi equity financing;
- intermediated finance through local financial institutions or through non-financial intermediaries, such as utilities, energy service companies (ESCOs) and supply chain;
- large-scale public-private partnership framework programmes (greenfield and brownfield);
- sustainable property funds (commercial and private residential buildings);
- green-labelled property bonds (commercial/public buildings);
- structured financing: EPC/ESCOs (residential, public buildings).

European Bank for Reconstruction and Development provides numerous financing options for circular activities in the built environment, especially revitalizations<sup>55</sup>. Donor-funded concessional elements, grants and incentives are available to help early movers implement selected measures. The Bank also supports capital market transactions by purchasing green-labelled and climate bonds issued by clients. To enhance credit for a corporate client, the Bank pledged to provide interim liquidity to mitigate the risks associated with construction and operation.

53. KNF (2020): Informacja na temat sytuacji sektora bankowego.

54. Buildings Performance Institute Europe (2018): Financing Renovation of Building in Poland.

55. European Bank for Reconstruction and Development (2018): Green Buildings Investments.



# chapter 7



## **Barriers to circular businesses in Poland with suggestions for tackling them**



## 7.1 Regulatory obstacles

### • Complexity and instability of the legal framework

Frequent legislative changes and the complexity of the Polish law, environmental law in particular, puts a significant administrative burden on businesses and repels potential investors. Additionally, the monitoring and reporting of environmental data is often a complex process as companies are required to submit the same data to various authorities using different forms and formats.

### • Policies based on linear models

Policies are usually created considering a linear economic model. The lack of fit of the linear regulatory framework hinders the implementation of circular models. All formal requirements are easier to fulfil for linear business models, while day-to-day operations of circular businesses may face additional legislative challenges.

Example: If a material is defined and marked as waste, there is a substantial administrative burden to officially re-transform such a material for reuse. It discourages companies to use raw materials that are still valuable, as the costs often outweigh the potential reward.

### • Lack of support for circular business models

There are only few governmental financial incentives in place to stimulate the development of more circular business models. Moreover, not only are there not enough of such incentives, they are also limited to specific areas. In many cases, only very precisely indicated ideas related to environmental issues may possibly receive governmental support. Currently the most supported areas are photovoltaics and electromobility. Even in the cases mentioned, the circularity itself is not considered in the assessment for granting financial support.

Example: The Polish government has imposed a special tax on plastic bags as it wants to discourage customers from using them. However, the revenues from the tax are not used directly to incentivize other, more circular solutions.

These barriers can be tackled only by government intervention. To overcome the regulatory barriers and obstacles, new rules and regulations need to be implemented. Nevertheless, while constituting the new legal framework, it is crucial to mention that it should be as simple as possible, in order to avoid the first barrier mentioned, which is the complexity of law. Moreover, new regulations and policies should focus on waste minimization, as well as the recovery and reuse of resources. Government can decrease the regulatory barriers to a circular economy transition by:

- adjusting the already existing legislation to the new version based on circular approach;
- supporting funding, taxation and subsidy policies;
- developing cooperative partnerships;
- utilizing and enhancing circular procurement etc.

From an individual company's perspective flexibility could minimize the risks related to the current legislative framework. Those solutions may include:

- introducing flexible working environment;
- maintaining flexible framework of cooperation with subcontractors and suppliers;
- keeping a possibility of using alternative sources of supplies.

## 7.2 Lack of know-how

### • Lack of knowledge on circular economy and circular solutions

Another obstacle in transforming businesses into more circular ones is simply the lack of know-how. For companies, to be able to implement or support a circular business model, it is crucial to have a proper knowledge on circular economy as such. Information on what is needed to implement a new business model or transform the already existing one is indispensable. The lack of knowledge about the benefits of circular economy and solutions aimed at transitioning from linear to circular economy has been identified as one of the barriers to the implementation of circular economy practices among SMEs in particular.

A possible solution for this problem is education, understood as spreading the knowledge on circular economy itself and its benefits from a business perspective. A company experienced in development and/or implementation of circular business models can educate other stakeholders by:

- sharing its story and experiences using external communication platforms, such as social media;
- presenting solutions during conferences, webinars, trade fairs;
- supporting start-up incubators;
- participating in circular economy and environment-related events like: Circular Week<sup>56</sup>, EEC Green<sup>57</sup>, POLEKO Fairs<sup>58</sup>.

### • Lack of technical skills

As the general level of knowledge on circular economy is low, a frequent obstacle is the lack of skills which allow to identify, assess and implement more advanced technical solutions and technologies. Even if a project is assessed viable from a financial perspective, operational difficulties in implementation, related to the lack of adequately trained employees or subcontractors, may appear. Knowledge on how to transform the firm's current production operations into a circular direction may be crucial.

There is no simple solution to tackle this problem. However, all types of knowledge exchange platforms, knowledge centres, common education projects etc. may offer a significant support. From an entrepreneur's perspective, it is possible to start a cooperation with universities, post-graduate schools, or think-tanks. The project based on „knowledge + practice” approach can build technical skills of students (future employees) and provide additional expert knowledge to companies.

Example: European Circular Economy Stakeholder Platform, a joint initiative founded by the European Commission and the European Economic and Social Committee; CIRCO - a design thinking initiative supported by the Dutch government.

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56. <https://circularweek.org/en/>

57. [eecpoland.eu](http://eecpoland.eu)

58. <https://poleco.pl/en>

## 7.3 Linear approach to day-to-day business

### • Limited internal and external cooperation

Another reason why limited cooperation on new projects is a barrier to circular economy transition is that individuals, businesses and governments are all used to operating and making decisions within a linear system. For a majority of processes cooperation is neither assumed nor needed, or done in a limited scope. Implementing circular principles in the old linear system leads to difficulties as people along with organizations are not able to use potential synergies related to the implementation of a new cooperative solutions.

To tackle this issue two factors are necessary:

- Transparent communication on circular economy and circular businesses within the organization, which means:
  - integration of circularity in company's strategy and goals;
  - clear criteria for success.
- Example sharing among organizations.

Polish business field lacks an internal activity related to education and engagement in cooperating activities, or in some cases even networking. It is obvious that a circular organization involves more parties that interact in a more complex way than the traditional linear one. To bring them together, all parties must operate on the same wavelength and share a common sense of urgency of circular economy transition. Only people who know and understand circular economy can properly engage in the transition process. External actions which allow business partners and organizations to share circular network and cooperation models are needed. An example of an initiative which enables such experience sharing is Polish Circular Hotspot<sup>59</sup>.

### • Incorrect perception of the circular economy model and its benefits

Even at a business level, the circular business model is not seen as a valuable aspect of the product or service itself. In the Polish reality it is still seen very often as a part of Corporate Social Responsibility activity or an additional expense which does not necessarily lead to any specific financial profits or savings. With such a perception the willingness of business partners to invest or cooperate in such projects is limited.

Key aspects to consider in correcting the erroneous perception:

- providing proven success records of circular business models;
- introducing changes in criteria for assessment of business models from a circular perspective.

To create a proven success record of a company it is necessary to collect and analyse the data about its business model with a possibility of sharing the outcome publicly. Sharing success stories with basic measurable financial and operational indicators in internal communication with employees and in social media, website and during various industrial events, changes the perception of the model or initiative from public relations type to business-proven action.

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59. [circularhotspot.pl/en/hotspot](https://circularhotspot.pl/en/hotspot)

## 7.4 Focus on short term return and cost reduction

In many cases companies, especially small and medium enterprises<sup>60</sup>, as well as the stakeholders of these companies (like banks, bondholders, etc) may focus mostly on short term return and cost reduction. The investor's perspective is often limited to the next year or even quarter. Usually circular business initiatives require investments over a longer time frame, as the payback will often be spread over a longer period of time. Consequently, it is more difficult to find partners to cooperate on and investment in new circular models. It may therefore turn out more difficult to find financing for them.

To overcome this obstacle it is important to promote a better understanding of the concept of circularity and to create circular initiatives based on the full lifecycle of a product/service. This should be done on two dimensions:

- financial;
- operational.

From a financial perspective, circular businesses need to present their business model in a way that makes their future financial benefits clear. In the case of stakeholders, a different way of risk evaluation should be promoted. While assessing circular business opportunities, the estimated future value of resources and residuals should be included in the final evaluation. Moreover, long-term metrics and objectives should be a vital part of this new kind of assessment.

Another possibility worth considering is to start a cooperation with a bank that takes the environmental footprint of a potential project into account during project assessment. A good example of this practice is presented by ING Bank, which considers energy source and environmental effects in its project ranking process.

From an operational perspective, it is essential to concentrate on the full product lifecycle at the very beginning of the design process. The production process should be adjusted so that it reflects the overall cost reduction related to better design, production and management of the product or service through its whole lifecycle. Closing the loop of raw materials which normally get lost in a linear production process means that at first we may have to invest more in adapting our operations to this new environment. However, later in time we create savings due to the emerging possibility of using the same resources again. Overall it increases our profitability in the long run.

Example: Expanding the scope of the Extended Producers Responsibility schemes will allow businesses to include the post-consumer life of goods i.e. include the externalities of a product in its price. Such adjustment to the costs of a product will allow enterprises to fully reflect the true costs of the product's design, creation and restoration.

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60. Rizos et al. (2015): The Circular Economy: Barriers and Opportunities for SMEs.

## 7.5 Lack of a friendly business environment for circular economy initiatives

### • Little support for circular value chains

The major issue in case of supply chains is their linear organization and very poor or no reverse logistics activities. Even though potential suppliers or co-producers usually have their forward supply-chain organized very well within a linear business model, they probably lack the adequate processes needed to recover products in different phases of their lifecycle. It is visible in business-to-business cooperation but even more so in business-to-consumer relations. In the latter case the consumer has no incentive to return a product.

Another issue related to linear supply chains is the lack of knowledge about the existence of alternative closed loop supply-chains. Due to these organizational issues it is sometimes necessary to bear high costs caused by the lack of proper infrastructure and systems for reverse supply chains.

To solve this issue, synergies with additional partners, other than those within the suppliers' network, are recommended. A possible way to retrieve an end-of-life product could be a cooperation with waste management companies or producer's responsibility organizations which operate at the post-consumer stage of product existence. Another option is to work with start-up incubators or university business incubators where innovative and tailored solutions for retrieving raw materials can be invented.

### • Reluctance to share information

What hinders the development of circular value chains is often the lack of:

- data on the availability of secondary raw materials or formal requirements related to reusing such materials in the production process;
- collaboration which reduces the amount of available resources and limits the possibility of creating circular business models.

Possible solutions to this problem include open collaborations and communication practices. It is important to include circularity as a vital part of the supply strategy. Clearly defined goals related to the circular value chain monitored with the use of measurable parameters to verify the progress, enable the possibility of changing the approach of business partners. Furthermore, the general requirements regarding suppliers may be transformed into a sort of supplier's code of best practices designed to be shared with the market as part of the company's strategy.

Example: IKEA gradually implements more and more strict rules regarding the environmental standards for their suppliers as part of its supply strategy. It resulted in considerable changes in the business models of its suppliers<sup>61</sup>.

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61. Nasi dostawcy budulcem lepszego biznesu - IKEA, access: 15.01.2021.

## 7.6 Insufficient customers' awareness

In Poland, as in many other European countries, a clear trend of growing environmental awareness among consumers has emerged. Consumers show a growing demand for sustainable products. Yet still most Poles base their consumer choices primarily on the price of a product. Therefore, they could be less willing to buy a more expensive 'responsible' product when a cheaper alternative of similar properties is available.

Furthermore, in many cases goods that have been recycled, reused or repaired may be perceived as less valuable than new ones, made from virgin resources<sup>62</sup>. This perception makes marketing of goods produced within a circular model more challenging.

For any business to succeed, its most important challenge is to attract customers. For linear businesses the main message is fairly simple. It aims to explain that the advantages for the consumer outweigh the costs of a product or service. In case of circular businesses this main message is often supplemented by showing the circularity of a business model and explaining why it is so important. To successfully convey this message, the following best practices can be recommended<sup>63</sup>:

### 1. Identifying the right target group and building a community out of it.

Example: TooGoodToGo enables reclaiming food from various restaurants and bistros, which alternatively would be wasted. This way they attract both the customers that want to save money, as the saved meals are cheaper than the regular ones, but also people who want to act in a sustainable way.

### 2. Using the right strategy to promote a product and attach the consumer.

Example: If something requires changes in habits or an additional effort to use a certain product/service, it should be as simple and as attractive as possible. Therefore, the returnable packaging for a product should serve its primary purpose (protection of the good) but also the return scheme should be convenient for consumers.

### 3. Leading by example, proving feasibility.

Example: Sharing own experience and profitable circular business models from abroad. Indicating that a model has been already implemented in a different place and proving its success.

### 4. Facilitating dialogue about circular economy.

Example: Not only holding events concentrated on Circular economy itself but rather promoting the idea of circular business models on one's own example during industry fairs and conferences, chambers of commerce meetings, etc.

62. Pfeifer (2017): Barriers & enablers to Circular Business Models.

63. Kas et al. (2018): Barriers and Best Practices for the Circular Economy.

## 7.7 Barriers specific to foreign investors

### • Language barrier

One of the main barriers while doing business (not only circular one) is the language barrier. What has already been noticed by foreign investors present in Poland is that:

- Polish is not only preferred over English in speaking, Polish companies also prefer to have offers, contracts etc. in written down Polish.
- Polish companies (especially SMEs) prefer to do business with local Polish people.
- The possibility of networking and finding business partners is limited if not done in the Polish language.
- All official applications, documents, writings, agreements with public entities (authorities) are drafted and executed in Polish.

The main solution would be to start hiring local employees with a good level of English in speaking and writing who would be able to translate or to entirely take over some networking/communication responsibilities. Alternatively, one could find local business partners who could take over a part of responsibilities related to networking and interaction with some (especially smaller) clients, contractors, etc. A less expensive option may be to become part of a chamber of commerce or other industrial organization. They can assist in operating in the Polish business environment and in creating a network of cooperating companies, if necessary.

There is a standard set of solutions which can make starting a business activity in Poland easier. These include arranging Polish versions of:

- website;
- business description;
- offer;
- standard contract.

### • Lack of a local business network

Foreign entrepreneurs also face a notorious lack of a local business network. This obstacle mainly relates to two fields:

- local suppliers;
- recruitment of local staff.

In case of the first problem, to find potential suppliers one should consider:

- becoming a member of industrial organizations and associations;
- taking part in trade fairs and industry-oriented events;
- contacting other foreign companies investing in Poland.



### • Limitations in international transactions or deliveries

A circular business models is often based on reusing certain products or using waste from other production processes as materials. In all these kinds of business models, it is possible to encounter obstacles caused by restrictions in the use or transport of certain materials.

Example: Limitations imposed on the imports of goods which are formally labelled as waste or hygienic restrictions related to reusing products that are meant to come in contact with food.

To overcome this obstacle, one has to act on two dimensions. Firstly, it is crucial to be up-to-date with any formal requirements and possible legal limitations in the use of specific materials or goods in the planned business model. This may require some consultancy on the Polish regulations in order to identify the scope of restrictions and to find a formal way to comply with all the requirements. Sources of such information may include:

- external consultants;
- local authorities (however, they are mostly only Polish-speaking);
- organizations supporting business development such as national chambers of commerce<sup>64</sup>, embassies<sup>65</sup>, hotspots<sup>66</sup>.

Secondly, it is necessary to work on transparent communication, which will indicate the increased availability of resources in circular models and capabilities of their development, should any legal requirements be designed to support the circulation of raw materials. In a long-term perspective, it may enable a less restrictive approach to some solutions that are based on the reuse of goods or remanufacturing and recycling processes (see also: subchapter 7.2).

### • Linear approach to waste

In Poland linear approach to waste is still a dominant one. Inter alia, this is due to a relatively low price of waste disposal activities in comparison to other European countries. This means that often circular business may not seem as attractive from the financial perspective as alternative cost of waste disposal is low.

To tackle this barrier legal changes are required. As long as the disposal of waste is cheaper than its treatment, the attractiveness of circular models will be limited. However, from a business perspective, it is possible to overcome this barrier by:

- cooperating directly with suppliers that generate 'waste' which could be used as a resource for our targeted production process;
- limit costs of circular activities e.g. by sharing the same premises with other businesses and using the same logistic systems.

### • Differences in the acceptable level of the price of the final product

When expanding into the Polish market from Western Europe it is important to remember that the average level of acceptable prices for consumers in Poland is considerably lower. Apart from luxurious

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64. Welcome to the NPCC - Netherlands-Polish Chamber of Commerce

65. Netherlands embassy in Warsaw | Poland | [netherlandsworldwide.nl](https://netherlandsworldwide.nl)

66. [circularhotspot.pl/en/hotspot](https://circularhotspot.pl/en/hotspot)

products, most people in Poland are generally not ready to pay prices which would be equivalent to those in Western Europe.

As an effect, it is necessary to adjust prices accordingly, having in mind the prices of substitutes available on Polish market. Furthermore, if the circular aspect of a product is the differentiating factor, it is important to avoid barriers mentioned earlier, such as incorrect perception of lower quality of circular products.

Considering this fact, it may be beneficial from a marketing perspective to develop and share a story of a product, the price of which reflects all the social and environmental costs that had to be accounted for in the production process<sup>67</sup>.

Example: The minimum salary in Poland is c.a. € 660, while in the Netherlands it is € 1.684,80. If we compare it using purchasing power parity in relation to the EU average, it equals 51,5% in Poland and 138,5% in the Netherlands<sup>68</sup>.

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67. Why cheap groceries will hurt us all in the long run | Environment| All topics from climate change to conservation | DW | 14.09.2020

68. Polska bieda. Ta mapa pokazuje, jak wyglądamy na tle Europy - Money.pl, access: 15.01.2021.



## Useful definitions

The below definitions were taken from Eurostat environment glossary<sup>69</sup>, or in case of Circular Economy and sectors' definitions were developed by the authors.

**Bioeconomy** comprises those parts of the economy that use renewable biological resources from land and sea – such as crops, forest, fish, animals, and micro-organisms – to produce food, materials and energy.

**Built environment** is defined as man-made structures, features, and facilities in which people live and work.

**Circular Economy** is an economic model that aims to maximise the value of assets in the economy, simultaneously optimising the use of resources and minimising the generation of waste; consequently focusing on retention of value.

**Disposal of waste** means: the collection, sorting, transport and treatment of waste as well as its storage and tipping above or under ground; the transformation operations necessary for its re-use, recovery or recycling.

**Energy sector** comprises of industries involved in the production process (including fuel extraction, manufacturing, refining) and the supply and distribution of energy in all of its forms.

**Municipal waste** consists of waste collected by or on behalf of municipal authorities and disposed of through waste management systems. Municipal waste consists mainly of waste generated by households, although it also includes similar waste from sources such as shops, offices and public institutions.

**Organic farming** is a way of agricultural production which uses organic production methods and places the highest emphasis on environmental and wildlife protection and, with regard to livestock production, on animal welfare considerations. Organic production involves holistic production management systems for crops and livestock, emphasizing on-farm management practices over off-farm inputs.

**Recovery of waste** means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

**Recovered products** are by-products of other processes and may be re-used for other purposes. They include slurries, combustible waste-heap shale, recycled lubricants, and certain products recovered from industrial processes.

**Recycling** is a recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.

**Renewable energy** sources, also called renewables, are energy sources that replenish (or renew) themselves naturally. Typical examples are solar energy, wind and biomass.

**Reuse** of waste means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

**Waste** means any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force.

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69. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Category:Environment\\_glossary](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Category:Environment_glossary)



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# Useful links

[www.arp.pl/en](http://www.arp.pl/en)

[www.circularhotspot.pl](http://www.circularhotspot.pl)

[www.enterprise.fgsa.pl/](http://www.enterprise.fgsa.pl/)

[www.ncbr.gov.pl](http://www.ncbr.gov.pl)

[www.paih.gov.pl/en?lang\\_id=17](http://www.paih.gov.pl/en?lang_id=17)

[www.paiz.gov.pl](http://www.paiz.gov.pl)

[en.parp.gov.pl/](http://en.parp.gov.pl/)





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