

POLAND

Decarbonisation of the Industrial Sector: Sustainable Finance as an Opportunity?



REVIEW OF THE
HARD-TO-ABATE
SECTOR'S
DECARBONISATION
IN VISEGRAD 4

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POLAND

The manufacturing industry is the most energy intensive sector of Polish economy and one of the greatest emitters: as for 2019, manufacturing was responsible for 14% of total national GHG emissions and had a 38% cut of the national electricity consumption¹. Given that the Polish energy mix is highly reliant on fossil fuels (app. 70% of Polish energy comes from this source²) industrial production has a large CO₂ emission footprint owing to the energy uptake.

There is an urgent need for industry decarbonization in Poland, by decarbonizing industrial processes, increasing energy efficiency and supplying green energy to industrial plants.

Some industrial branches, i.e. cement, steel and chemical production, are referred to as “hard-to-abate”. They are especially difficult to decarbonize, as the substantial part of their emissions is related to production processes themselves and not to electricity needs. These emissions gave up to 7% of total Poland’s CO₂ emissions in 2019³. Alternative technologies are needed, such as hydrogen-based steel and ammonia production or carbon capture and storage (CCS) to abate emissions. This report therefore identifies key opportunities and, foremost, barriers in the policy and regulatory framework, as on the financial market, to conduct the industry decarbonization in Poland on a large scale.

Industry decarbonization efforts in the European Union are steered by the EU climate policy.

¹ Eurostat, Air emissions accounts by NACE Rev. 2 activity and Energy supply and use by NACE Rev. 2 activity.

² International Energy Agency (2022), “Poland 2022. Energy Policy Review”

³ Calculations based on emissions reported by EU ETS installations in the referred branches

The emission revenues from ETS represent an important source of finance in the state budget, but the worry is that they have not been spent on climate action to a sufficient extent.

INDUSTRY BARRIERS TO DECARBONIZATION

Industry decarbonization efforts in the European Union are steered by the EU climate policy. Carbon Border Adjustment Mechanism, amendments to the EU ETS scheme and the Commission's efforts in greening international trade prod national producers to invest in carbon neutrality, if they want to remain competitive. However, the implementation of these EU-level policies may encounter barriers on national (Polish) level, embedded in, e.g., national policy and regulatory environment, and financial opportunities, which will slow down the whole process.

First, Poland has no policy and regulatory tools in place to tackle industry decarbonization. The strategic climate planning failed to prioritize the issue and legal barriers hamper the development of alternative abatement technologies, such as carbon capture and storage technologies (CCS).

The Polish government is unfazed by the threat industry emissions pose hence dedicated public funding is practically nil on that. The emission revenues from ETS represent an important source of finance in the state budget, but the worry is that they have not been spent on climate action to a sufficient extent.

To make matters worse, private finance has been sluggish. Lacking comprehensive and credible transition strategies, manufacturing companies risk access to fresh funds geared towards decarbonization.

In the following section we outline the market and economic conditions the hard-to-abate sectors face and detail the obstacles to making investment to decarbonization technologies.

Steel production

Emissions from steel industry

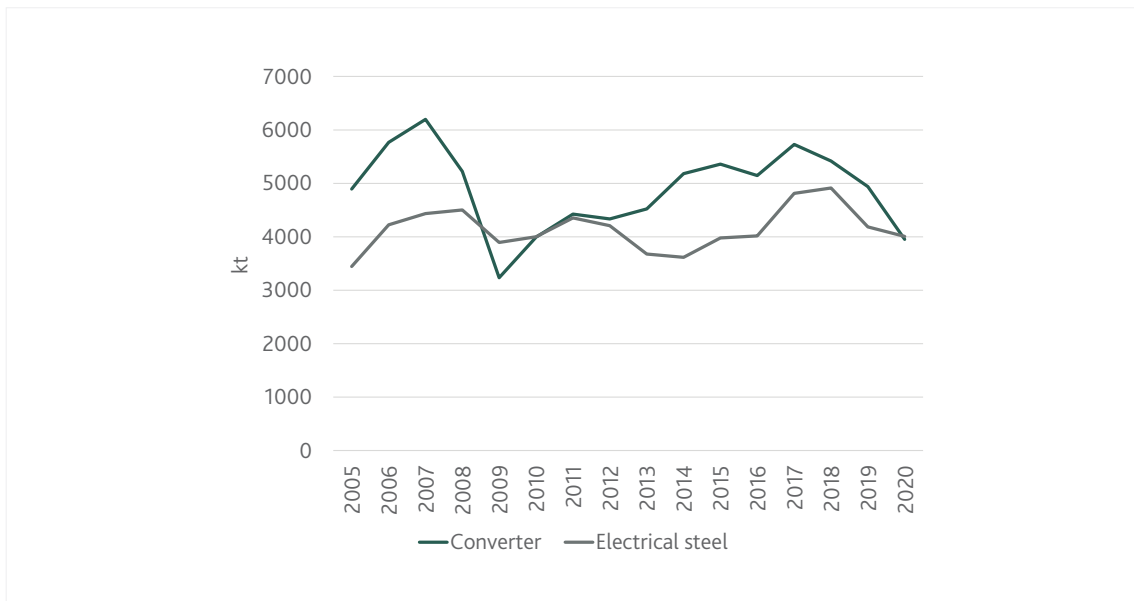
Main emissions from steel production are generated in blast furnaces with basic oxygen furnace (BF-BOF route) which is the most common method of obtaining ore-based steel.

ArcelorMittal Poland operates the two active blast furnaces in Dąbrowa Górnicza. These facilities account for approximately 85% of total emissions from steel production installations covered by ETS in Poland.

There are also seven electric arc furnaces (EAF) in Poland. This method uses steel scrap for recycling and produce much less CO₂, however, due to the impurities, it is typically used to produce lower quality steel than the one from the BF-BOF route.

Drawing on production data from 2020, half of steel produced in Poland comes from BF-BOF route, and the other half from electric arc (EAF) route (see **Figure 1**).

Figure 1. Crude steel production in Poland



Source: Statistics Poland

Table 1. Emissions from stationary steel installations under the EU ETS

Name of installation	Location (city)	ETS ID	2020 emissions [kt CO ₂ eq]	Owner
Walcownia	Ostrowiec Świętokrzyski	PL_210474	10,385	Walcownie Ostrowieckie WOST S.A.
ZAKŁAD WYROBÓW KUTYCH, ZAKŁAD WYROBÓW WALCOWANYCH	Ostrowiec Świętokrzyski	PL_657	59,164	Celsa Huta Ostrowiec Sp. z o.o.
STALOWNIA	Warszawa	PL_660	48,871	ArcelorMittal Warszawa Sp. z o.o.
STALOWNIA	Zawiercie	PL_371	122,183	CMC Poland Sp. z o.o.
inst. elektrostal. Cognor SA Oddz Ferrostal Łabędy	Gliwice	PL_372	33,031	Cognor S.A.
STALOWNIA	Stalowa Wola	PL_373	37,193	Cognor S.A.
Alchemia SA Oddział Stalownia Batory	Chorzów	PL_733	13,914	Impexmetal S.A. (Alchemia S.A.)
Zakład Stalownia	Częstochowa	PL_488	38,275	Liberty Częstochowa
WIELKI PIEC	Szczecin	PL_489	0	Huta Szczecin S.A. (closed)
WIELKI PIEC+STALOWNIA ARCELORMITTAL KRAKÓW	Kraków	PL_885	4,587	ArcelorMittal Poland S.A.
WIELKI PIEC STALOWNIA ARCELORMITTAL DĄBROWA GÓRN.	Dąbrowa Górnicza	PL_886	2353,268	ArcelorMittal Poland S.A.
WALCOWNIA FERROSTAL ŁABĘDY	Gliwice	PL_904	0	Ferrostal Łabędy Sp. z o.o. (Cognor) (closed)

Source: European Union Transaction Log (EUTL) data

Table 2. Ownership structure of steel production installations under the EU ETS

Owner	Installation name	Main activity/ production technology	2020 cumulative ETS emissions [kt CO ₂ eq]
ArcelorMittal	STALOWNIA	EAF	2406,726
	WIELKI PIEC+STALOWNIA ARCELORMITTAL KRAKÓW	Rolling mill	
	WIELKI PIEC STALOWNIA ARCELORMITTAL DĄBROWA GÓRN.	BF	
CMC Poland	STALOWNIA	EAF	122,183
CELSA Group	Celsa Huta Ostrowiec sp. Z o.o.	EAF	59,164
Alchemia S.A.	Alchemia SA Oddział Stalownia Batory	EAF	13,914
Cognor S.A.	inst. elektrostal. Cognor SA Oddz Ferrostal Łabędy	EAF	70,224
	STALOWNIA	EAF	
Walcownie Ostrowieckie WOST S.A.	Walcownia	Rolling mill	10,385
Liberty Częstochowa	Zakład stalownia	EAF	38,275

Source: EUTL data

Climate protection goals

Table 3. Decarbonisation plans of Polish steel producers

Company	Interim goals of CO ₂ emission reduction	Climate neutrality goal (company/national PL level)	Considered (X) low-carbon technology solutions							Green investments in Poland
			Alternative feedstocks	CCUS	EE	DRI (hydrogen)	RES	Electrification	Increased use of scrap	
Arcelor-Mittal	By 25% globally (Scope 1 and 2 emissions) in 2030 (2018 baseline); by 35% in Europe (Scope 1 and 2 emissions) until 2030 (2018 baseline)	Yes, in 2050 at company level	X	X	X	X	X	X	X	ND
CMC	By 20% at company level (Scope 1 and 2 emissions) until 2030 (2019 baseline)	No	-	-	X	-	X	-	-	ND
CELSA Group	70% in 2025 (Scope 1 and 2)	Yes, before 2050 (net positive in 2050) at company level	X	X	X	X	X	-	-	ND
Cognor S.A.	ND									
Walcownie Ostrowieckie WOST S.A.	ND									
Liberty Steel Group (Liberty Częstochowa)	-	Carbon neutral by 2030 at company level	ND							400 kW of solar power operating at the Częstochowa plant, additional 2,6 MW are due

Source: Publicly available sustainability reports and press releases. ND – no data; CCUS – Carbon Capture, Utilisation and Storage; EE – Energy Efficiency

Barriers to decarbonization of the steel sector: financial or technological?

As it can be seen in the **Table 4**, financial situation of Polish steel companies is not a major impediment to the decarbonization efforts. The steelmakers generate steady gains, and even if not, like Arcelor Mittal, they are a part of larger, transnational groups which can provide financial assistance if necessary.

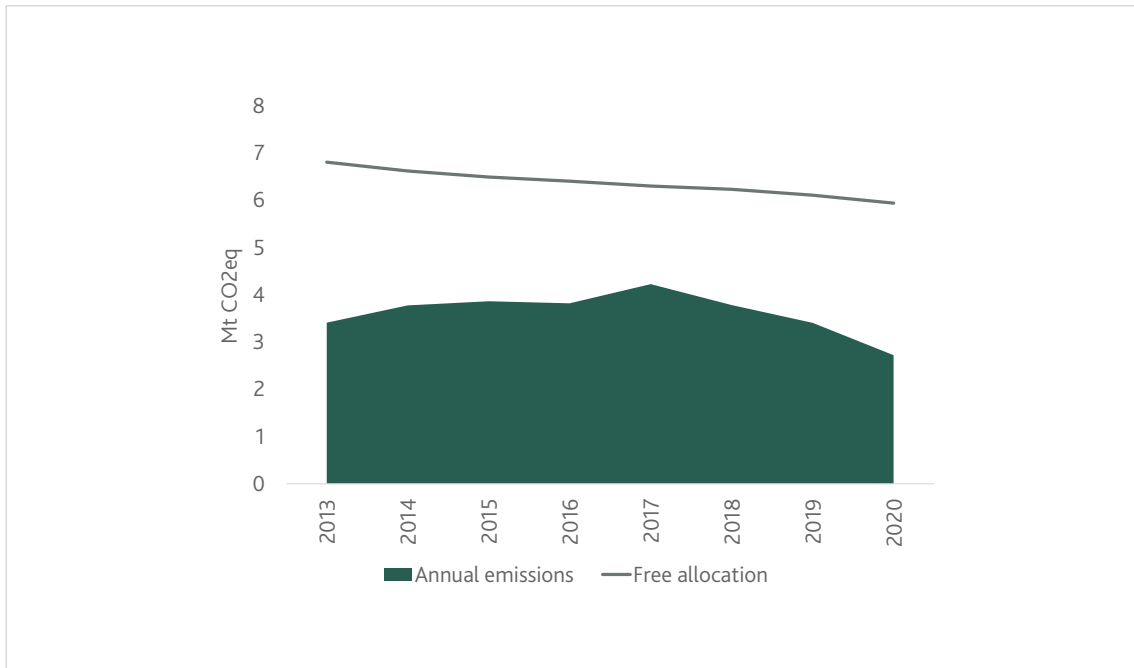
Table 4. Financial situation of Polish steel companies (in million PLN)

Company	Group	Indicator	Year		
			2018	2019	2020
Walcownie Ostrowieckie WOST		Revenue from sales	174	193	202
		Profit on sales	15	23	35
		Net profit	4	10	18
Celsa Huta Ostrowiec		Revenue from sales	3187	2814	2417
		Profit on sales	392	273	204
		Net profit	118	71	166
ArcelorMittal Warszawa	ArcelorMittal	Revenue from sales	1595	1385	1145
		Profit on sales	142	50	-7
		Net profit	86	34	-11
ArcelorMittal Poland		Revenue from sales	16869	16634	14223
		Profit on sales	286	-703	-791
		Net profit	518	-438	-1181
CMC Poland*		Revenue from sales	3111	2734	4147
		Profit on sales	244	66	410
		Net profit	191	86	382
Cognor		Revenue from sales	2072	1889	1728
		Profit on sales	275	169	155
		Net profit	66	12	15
Alchemia		Revenue from sales	894	681	601
		Profit on sales	78	16	7
		Net profit	15	-21	-31
Liberty Częstochowa (closed)		Revenue from sales	1050	X	X
		Profit on sales	-175	X	X
		Net profit	-138	X	X

Source: Financial statements available at https://ekrs.ms.gov.pl/rdf/pd/search_df (online platform administered by National Court Register, Polish national register of enterprises). *Reporting period: September – September

Decarbonization of steel companies could be incentivized by the existing carbon pricing. However, the current EU Emission Trading Scheme does little to jostle the Polish steelmakers. The bulk of the sector's emissions are financed with free allowances and, as the **Figure 2** shows, Polish steel industry is currently not suffering from a shortage of free allowances. Therefore, there is no economical thrust to reduce CO₂ emissions.

Figure 2. Share of free allowances in total emission from steel production



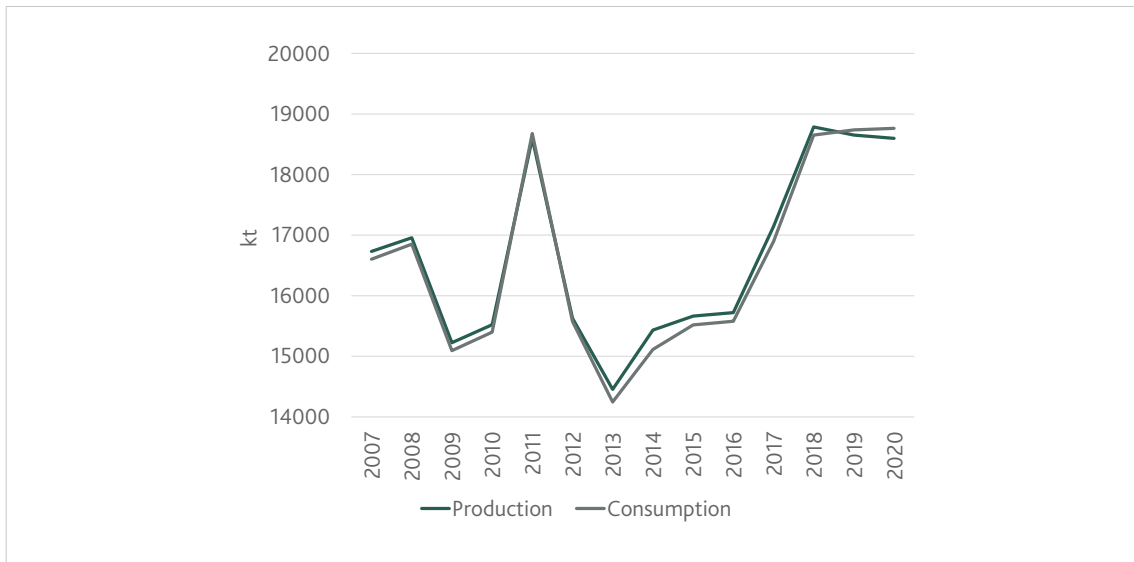
Source: EUTL data

The regulatory framework is not adopted to deal with new technologies. The legal and policy barriers to deploying low-carbon technologies we discuss in detail in the chapter on Policy (Current regulatory environment of green technologies for industry).

Cement industry

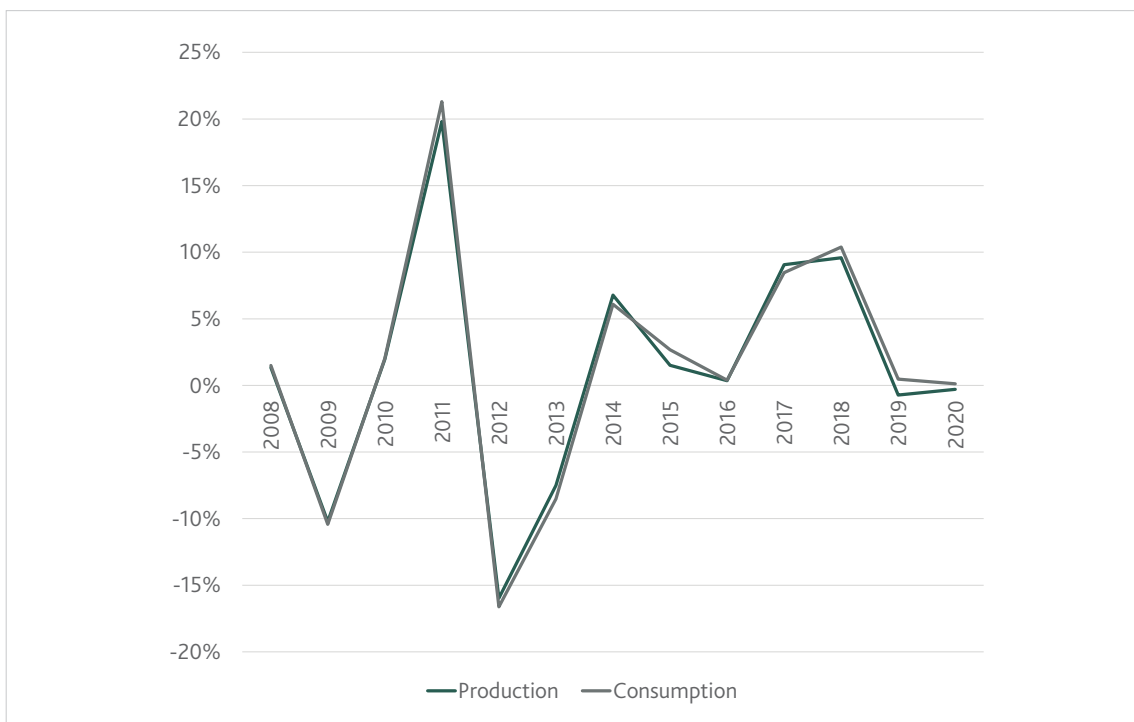
Cement market in Poland is rather pro-cyclical, i.e. cement production reflects wider economic conditions after 2008 financial crisis and in the following decade (see Figure 3 and Figure 4).

Figure 3. Production and consumption of cement in Poland



Source: Polish Cement Association

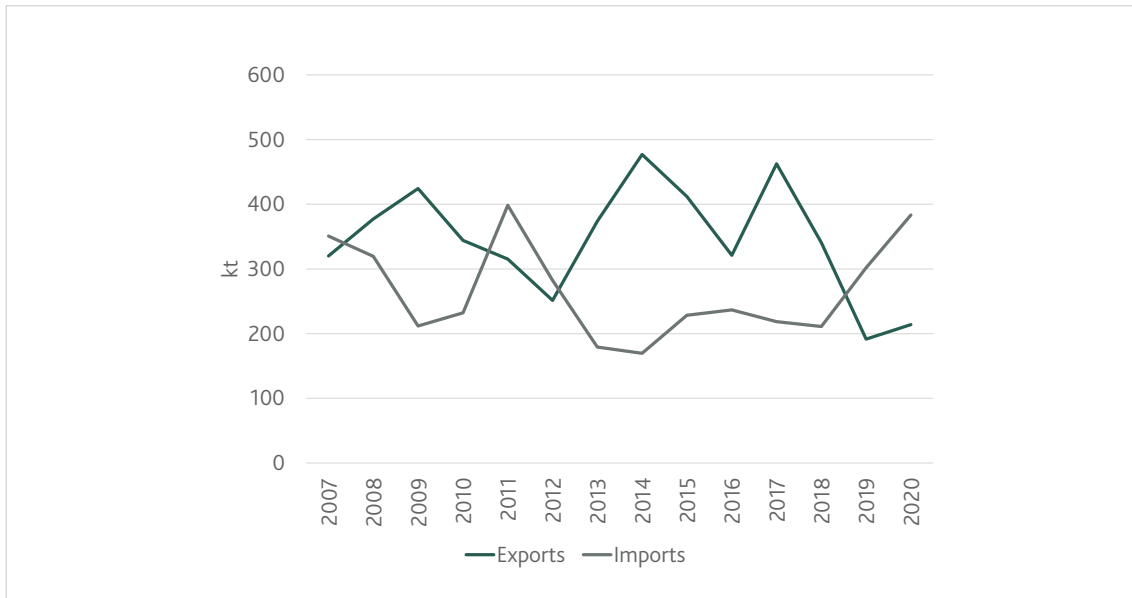
Figure 4. Change year-over-year of cement's production and consumption in Poland



Source: Polish Cement Association

After financial crisis in 2008 consumption faltered. The recovery proved fast albeit short-lived. Growth rates have bounced back by around 2014 but pre-financial crisis production levels were only reached past 2017 to about 19 000 kt annual production level.

Figure 5. Imports and exports of cement in Poland



Source: Polish Cement Association

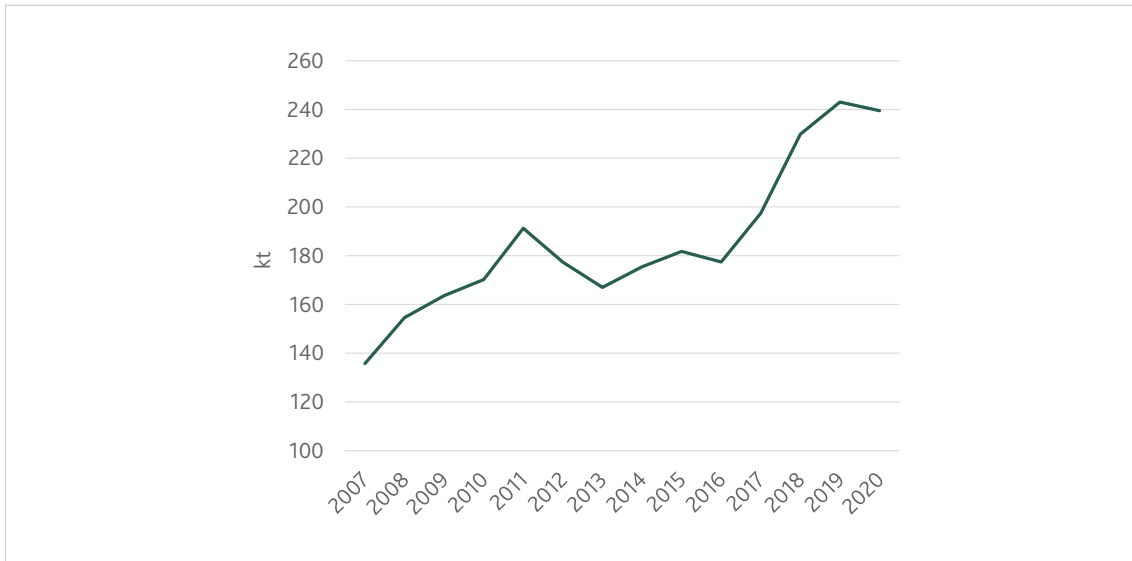
Cement is typically domestically produced as its “high density and low product value result in high commodity transport costs and limit its regional and global trade”⁴. For this reason international trade of cement is negligible and tend to balance temporary supply bottlenecks (see **Figure 5**). Poland’s key trading partners are Belarus, Ukraine but international trade is rather negligible. Barring a stronger competition for export shares, Polish decarbonization efforts are hardly influenced by tendencies abroad.

The construction sector heavily depends on cement. To that we can add that **construction sector also takes about 41% of Polish steel products**⁵. Construction activities move with the economic cycles and cement market to certain extent reflects movement on the construction market – compare below **Figure 6** and **Figure 7**.

⁴ NewClimate (2020), “Decarbonisation pathways for the EU cement sector: Technology routes and potential ways forward”

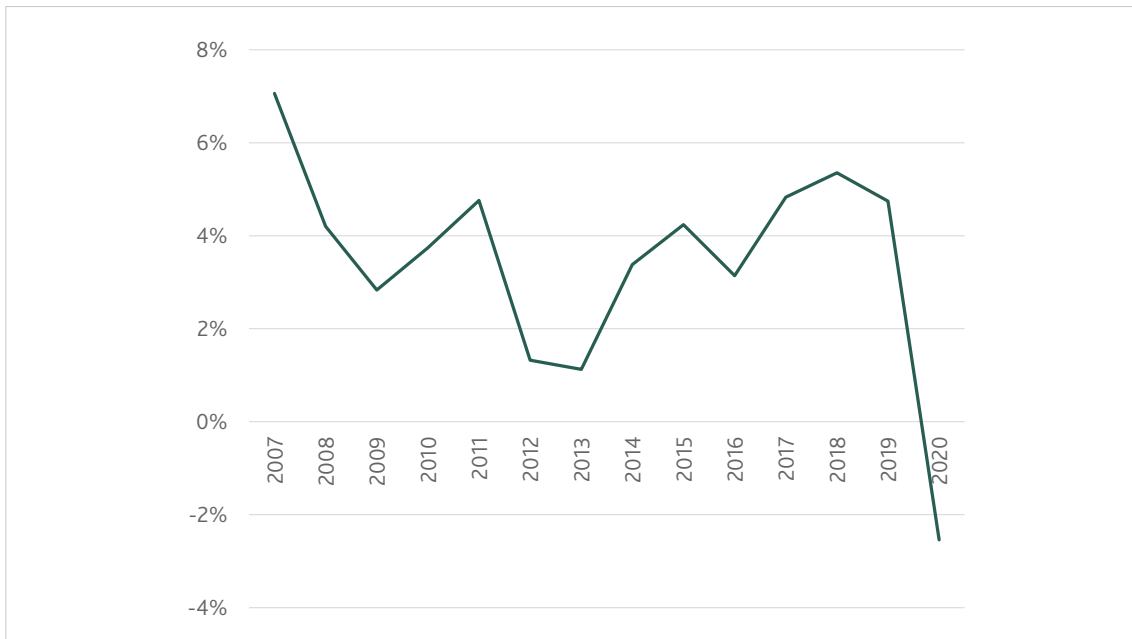
⁵ “Polityka Przemysłowa Polski” (Poland’s Industrial Policy), p. 41.

Figure 6. Investments in construction sector in Poland (billion PLN, in current prices; dynamics shown in constant prices)



Source: Statistics Poland

Figure 7. GDP development in Poland



Source: World Bank

COVID-19 pandemic shock (reflected by a sharp drop in GDP) was short lived and did not hurt the cement sector (see **Figure 4**). Going forward, rate hike cycle (caused by efforts of the National Bank of Poland to fight the two-digit inflation in Poland) will however likely cool the sector as the credit crunch will weigh on the construction sector's performance.

Around one third of all procurements originates in the public sector as the **Table 5** shows.

Table 5. Public and private procurement in the construction market in %

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Public	44,64	30.85	34.99	34,43	32.17	22.42	21.88	38.44	42.63	31.1	34.96
Private	55.36	69.15	65.01	65.57	67.83	77.58	78.12	61.56	57.37	68.9	65.04

Source: Statistics Poland and Public Procurement Office

The public sector's demand for greener buildings could drive the decarbonization of the construction and, consequently, cement industry (and to some extent the steel industry), through green public procurements (this tool is further discussed in **Gaps in the policy and regulatory environment**).

Emissions from cement industry

There are nine operating cement kilns for clinker production in Poland; two installations were recently closed⁶. Approximately 83% of emissions in this sector are produced by sites owned by multinational cement groups (see). We then focus our analysis on reviewing and understanding large cement groups' initiatives for cutting down their CO₂ emissions and comparing them to capabilities of local companies with lower financial capabilities.

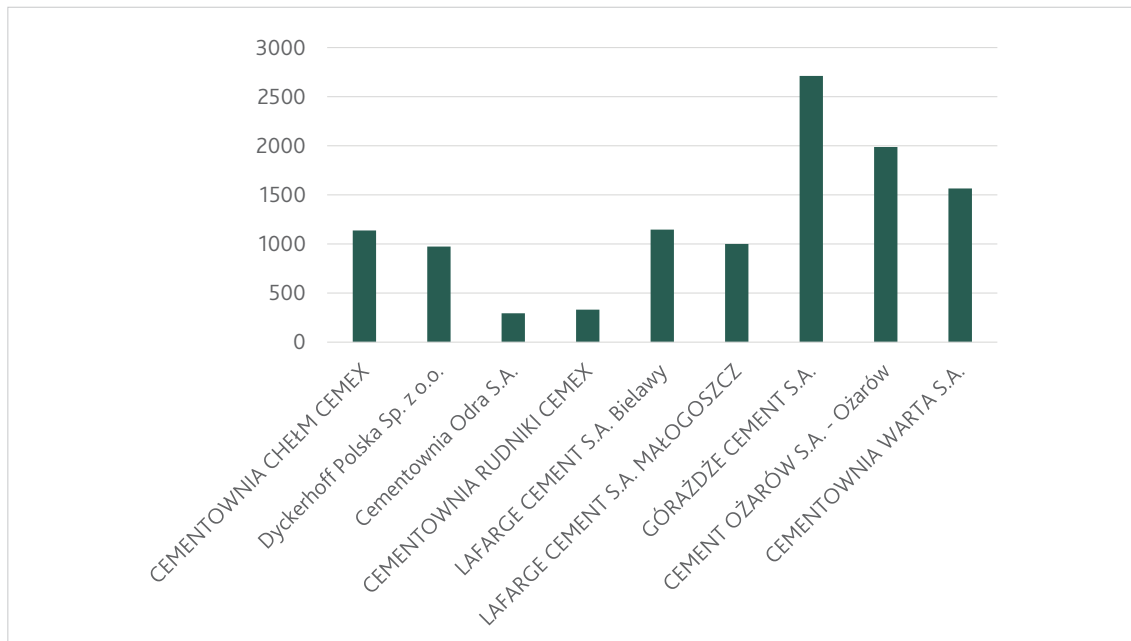
⁶ Cementowania Nowa Huta in Cracow was shut down in 2010 and in 2017 the closure of Zakład Cementownia Rejowiec took place.

Table 6. Cement-related emissions from stationary installations under EU ETS

Name of installation	Location (city)	2020 emissions [kt CO ₂ eq]	Owner
Cementownia Chełm CEMEX	Chełm	1138,329	Cemex
Cementownia Nowa Huta	Kraków	<i>closed</i>	
Dyckerhoff Polska Sp. z o.o.	Nowiny	974,368	Dyckerhoff
Cementownia Odra S.A.	Opole	294,823	Miebach Projektgesellschaft mbH
Grupa Ożarów S.A. Zakład Cementownia Rejowiec	Rejowiec Fabryczny	<i>closed</i>	
Cementownia Rudniki CEMEX	Rudniki	332,226	Cemex
LAFARGE CEMENT S.A. Oddział w Bielawach	Piechcin	1147,102	LafargeHolcim
LAFARGE CEMENT S.A. Cementownia Małogoszcz	Małogoszcz	1000,691	LafargeHolcim
GÓRAŹDŹE CEMENT S.A.	Góraźdże	2711,325	Heidelberg Cement
CEMENT OŹARÓW S.A. Zakład Cementownia Ożarów	Ożarów	1988,623	CRH
CEMENTOWNIA WARTA S.A.	Trębaczew	1565,693	OLEN ZEMENT BETEILIGUNGS-GESELLSCHAFT mbH

Source: EUTL data

Figure 8. Emissions share of the cement sector by installation in 2020



Source: EUTL data

Table 7. Ownership structure of clinker production installations

Owner	Installation	2020 emissions [kt CO ₂ eq]
Cemex	CEMENTOWNIA CHEŁM CEMEX	1138,329
	CEMENTOWNIA RUDNIKI CEMEX	332,226
Dyckerhoff	Dyckerhoff Polska Sp. z o.o.	974,368
LafargeHolcim	LAFARGE CEMENT S.A. Oddział w Bielawach	1147,102
	LAFARGE CEMENT S.A. CEMENTOWNIA MAŁOGOSZCZ	1000,691
Heidelberg Cement	GÓRAŹDŹE CEMENT SPÓŁKA AKCYJNA	2711,325
CRH	CEMENT OŹARÓW S.A. - Zakład Cementownia Ożarów	1988,623
Polen Zement Beteiligungsgesellschaft mbH	CEMENTOWNIA WARTA S.A.	1565,693
Miebach Projektgesellschaft mbH	Cementownia Odra SA	294,823

Source: EUTL data, Polish Cement Association

Climate protection goals

Table 8. Decarbonisation plans of Polish cement producers

Company	No. of clinker production plants	Share of PL emissions from cement sector	CO ₂ reduction to date	Interim emission goals of CO ₂ reduction	Climate neutrality goal (company/national PL level)	Considered (X) low-carbon technology solutions						Green investments in Poland
						Innovative clinkers and additives	CCUS	EE	Circular economy	Electricity from RES	Alternative fuels	
Cemex	2	13%	22% compared to 1990 (as of 2019)	By >40% until 2030 compared to 1990 (23% and 29% for Polish cement plants)	Yes, by 2050 at company level	X	X	X	X	X	X	100% green energy from PGE Obrót (for years 2020-2021), use of waste heat in district heating, alternative fuels
Dyckerhoff	1	9%	17% compared to 1990 (as of 2021)	Scope 1 CO ₂ emissions below 500 kg per ton of cement by 2030 (35% reduction vs. 1990)	Yes, by 2050 at company level	X	X	X	-	X	X	ND
LafargeHolcim	2	19%	29% compared to 1990 (Scope 1 and 2 emissions)	By 55% until 2030 compared to 1990 (in Poland)	Yes, by 2050 at company level (within all emission scopes)	X	X	X	X	X	X	100% green energy, CCS project at the Kujawy cement plant, solar PPA with Qair Polska, use of waste heat in Bielawy and Małogoszcz
Company	No. of clinker production plants	Share of PL emissions from cement sector	CO ₂ reduction to date	Interim emission goals of CO ₂ reduction	Climate neutrality goal (company/national PL level)	Considered (X) low-carbon technology solutions						Green investments in Poland
						Innovative clinkers and additives	CCUS	EE	Circular economy	Electricity from RES	Alternative fuels	
Heidelberg Cement	1	24%	25% compared to 1990 (as of 2021)	By 47% until 2030 compared to 1990	Yes, by 2050 at company level	X	X	X	X	X	X	Solar PPA with BayWa r.e.; Carbon capture installation at the Góraźdże cement plant (ACCSESS project)

Company	No. of clinker production plants	Share of PL emissions from cement sector	CO ₂ reduction to date	Interim emission goals of CO ₂ reduction	Climate neutrality goal (company/national PL level)	Considered (X) low-carbon technology solutions					Green investments in Poland	
						Innovative clinkers and additives	CCUS	EE	Circular economy	Electricity from RES		Alternative fuels
CRH	1	18%	26% compared to 1990 (as of 2020)	By 25% within Scopes 1 and 2 until 2030 compared to 2020	Yes, by 2050 at company level	X	X	X	X	X	X	ND
Polen Zement Beteiligungsgesellschaft mbH	1	14%	ND									
Miebach Projektgesellschaft mbH	1	3%	ND									

Source: Publicly available sustainability reports and press releases. ND – no data; CCUS – Carbon Capture, Utilisation and Storage; EE – Energy Efficiency

Barriers to decarbonization: financial or technological?

Not only can the abovementioned fight with the two-digit inflation stifle the construction market, but also have an impact on the conditions under which bank loans will be given to companies – interest rates associated with these loans will be higher. This might prevent cement companies from applying for finance for decarbonisation of their process (and this is also the case for steel and chemical sector).

However, if we set this problem aside, we can see that Polish cement companies (or Polish branches of international cement groups) are in a good and stable financial situation (see **Figure 9**), which could allow them to self-finance the decarbonization process to some extent.

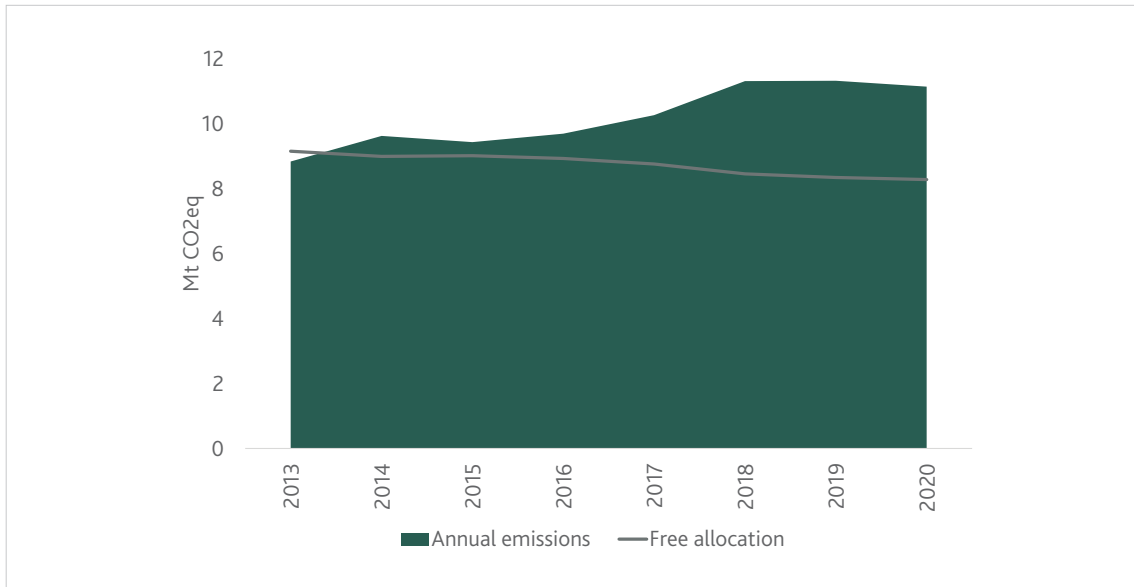
Table 9. Financial situation of Polish steel producers (in million PLN)

Company	Group	Indicator	Year		
			2018	2019	2020
Góraźdze Cement	HeidelbergCement	Revenue from sales	1160	1268	1437
		Profit on sales	320	416	369
		Net profit	249	357	457
Dyckerhoff Polska	Dyckerhoff	Revenue from sales	474	536	529
		Profit on sales	75	93	108
		Net profit	87	82	103
Lafarge Cement	LafargeHolcim	Revenue from sales	1439	1631	1612
		Profit on sales	215	334	388
		Net profit	145	244	275
Cement Ożarów	CRH	Revenue from sales	799	925	974
		Profit on sales	214	258	326
		Net profit	177	144	344
Cemex Polska	Cemex	Revenue from sales	1301	1341	1460
		Profit on sales	16	41	62
		Net profit	22	10	24
Cementownia Warta	Polen Zement	Revenue from sales	545	590	675
		Profit on sales	64	97	115
		Net profit	52	72	90
Cementownia Odra	Miebach	Revenue from sales	212	226	235
		Profit on sales	11	11	7
		Net profit	16	8	6
Górka Cement	Mapei	Revenue from sales	188	199	212
		Profit on sales	67	68	77
		Net profit	32	28	40

Source: Financial statements available at https://ekrs.ms.gov.pl/rdf/pd/search_df (online platform administered by National Court Register, Polish national register of enterprises)

We observe that the emission trading scheme provides little incentive to decarbonize cement production. **Figure 9** demonstrates that to a large extent Polish cement industry can finance emissions against the freely allocated limits but not entirely.

Figure 9. Share of free allowances in total emission in the cement industry



Source: EUTL data

Further reduction of number of free allowances can finally force the cement industry to seek methods to abate emissions.

Again, as it is the case for steel, currently cement sector does not suffer from shortage of available CO₂ emissions abatement technologies. More problematic is regulatory and policy environment, which is discussed later (**Policy**).

Chemical production

Emissions from chemical production

The chemical industry's own emissions have a share of 4.7% in EU ETS emissions. When Poland's total emissions considered, chemicals gave a more modest 1.5% of total national net emissions⁷ in 2019.

The sector is the most competitive internationally out of the hard-to-abate group. Poland is exposed to outside of EU competitors located in Belarus, Russia, Ukraine who don't face the same scrutiny and incur extra carbon costs.

The sectoral analysis is complicated by the technological complexities and product diversification in the sector. What's more, emission and production data at the lowest grain are not available.

Absent of more granular level information about the production and emission structures we continue to describe the sector based on the installations that report into the EU ETS's EUTL database. Therefore, in the analysis below we focus on the process emissions from Scope 1, which do not come from the fuel combustion installation to obtain electricity and process heat. This is also because data on energy consumption by chemical production is not granular enough and because discrepancies between EU ETS and NACE classifications.

True, chemical industry accounts for a substantial share of electricity consumption in Poland. Latest data from 2019 showed that manufacturing of chemicals and chemical products was responsible for 6% of total electricity consumption by NACE activities and manufacturing of rubber and plastic products consumed 2.86% of total inland demand for electricity by NACE activities⁸, which translates into substantial Scope 2 emissions. Undeniably, deep decarbonization of Poland can only be achieved by energy sector decarbonization.

Chemical industry emissions in Poland are concentrated in five key products. The provided below includes installations from these largest product groups: products of oil refining (oil and petroleum), ammonium production, nitric acid production, bulk chemicals, and carbon black production⁹.

⁷ According to the National Inventory Report submitted to UNFCCC.

⁸ Eurostat, Energy supply and use by NACE Rev. 2 activity

⁹ Due to this scope of analysis the production of soda ash has been left out and therefore the activities of the company Ciech (one of the biggest industrial companies and producers – 476,326 kt CO_{2eq} in 2019) have not been included

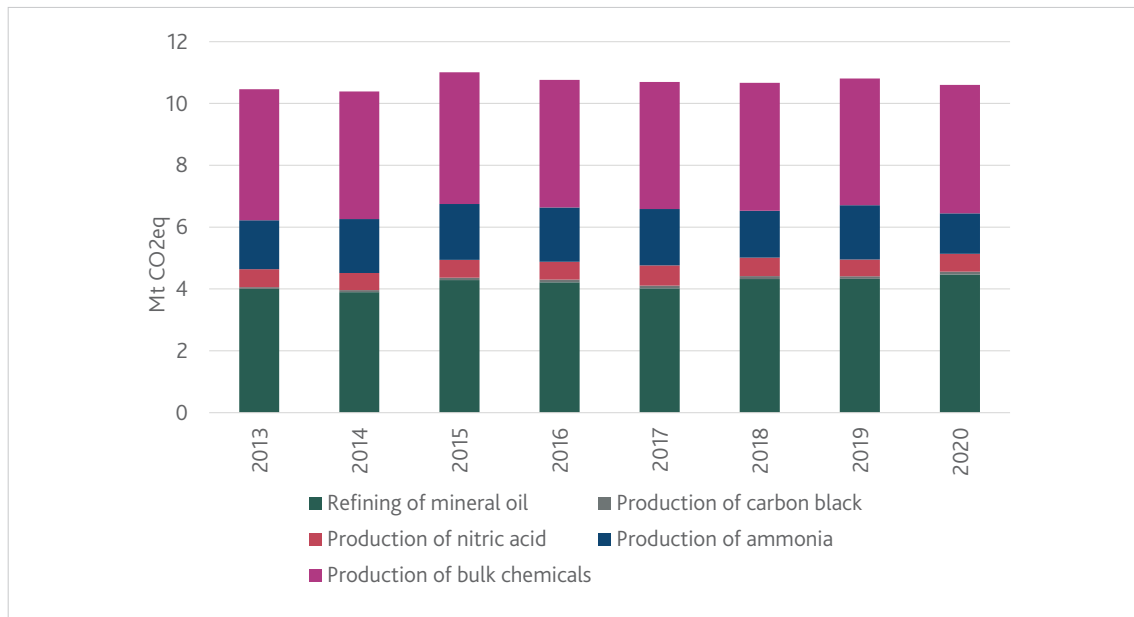
Table 10. Emitters under selected ETS activities of the chemical industry

ID	Name of installation	2019 emissions [kt CO ₂ eq]	ETS activity	Company	Main product
362	Rafineria	2,567	21	Orlen	Oil and petroleum products
202510	Zakłady Azotowe Puławy S.A.	2,132	42	Azoty	
361	INSTALACJE RAFINERYJNE	1,516	21	Lotos	Oil and petroleum products
202384	Instalacja do produkcji amoniaku	0,964	41	Azoty	Ammonia
880	Olefiny II	0,893	42	Orlen	Olefins (polymers)
202697	Instalacja do produkcji amoniaku	0,795	41	Anwil	Ammonia
203087	ZAK Spółka Akcyjna	0,764	42	Azoty	
203112	Jednostki produkcyjne	0,477	38	Azoty	Nitric acid
648	LOTOS ASFALT Sp. z o.o. Zakład Produkcyjny Gdańsk	0,211	21	Lotos	Oil and petroleum products
202471	Instalacja do produkcji chemikaliów org. luzem	0,093	42	Orlen	
202096	Instalacja do produkcji sadzy	0,085	37	Orion Engineered Carbons Sp. z o.o.	Carbon black
202699	Instalacja do produkcji chemikaliów organicznych	0,083	42	Anwil	
202698	Instalacja do produkcji kwasu azotowego	0,064	38	Anwil	Nitric acid
202816	Poliolefiny III	0,041	42	Basell Orlen	Polyolefins (polymers)
202473	Tlenek Etylenu i Glikolu	0,036	42	Orlen	Ethylene oxide and glycol
203354	INSTALACJA FORMALDEHYDOWO-KLEJOWA	0,015	42	Swiss krono	
202435	Instalacja formaliny SILEKOL	0,013	42	Pfleiderer Silekol	Formalin
644	ORLEN Południe SA Zakł. Jedlicze -Inst. rafineryjne	0,012	21	Orlen	Oil and petroleum products
202073	INST. DO PROD. WĘGLOWOD. AROMAT. I ODZYSKU KW.SIARK.	0,010	42	PETROCHEMIA-BLACHOWNIA	Aromatic compounds
809	Instalacja Destylacji Ruroro-Wieżowej	0,010	21	Orlen	Oil and petroleum products
202107	Instalacja do produkcji Styrenu	0,009	42	Synthos	Styrene
650	LOTOS ASFALT Sp. z o.o. Zakład Produkcyjny Jasto	0,006	21	Lotos	Oil and petroleum products
202534	Instalacja do produkcji formaliny	0,004	42	Kronospan Chemical Szczecinek Sp. z o.o.	Formalin
730	Instalacja oksydacji asfaltów	0,003	21	Orlen	Oil and petroleum products
633	Produkcja Asfaltu Płock	Closed in 2016	21	Orlen	Asphalt
640	Rafineria ropy naftowej	Closed in 2017	21	AIM-ENERGY SP. Z O.O.	Oil and petroleum products
925	KRAKING PETROCHEMICZNY ORLEN OIL	Closed in 2016	21	Orlen	Oil and petroleum products

Source: EUTL data

Most of the emissions are however concentrated in two EU ETS activities: oil refining (i.e. refineries, 2.4% share in PL EU ETS emissions in 2019) and bulk chemicals (2.3% share in PL EU ETS emissions in 2019), which are followed by a lower share of ammonia (0,7%), and nitric acid (0,3%) (see **Figure 10**).

Figure 10. Emissions from chemical industry installations covered by the EU ETS by activity



Source: EUTL data

Taking into account the emissions from these installations, currently the overwhelming majority of them are concentrated in Poland in three major producers (see **Figure 11**).

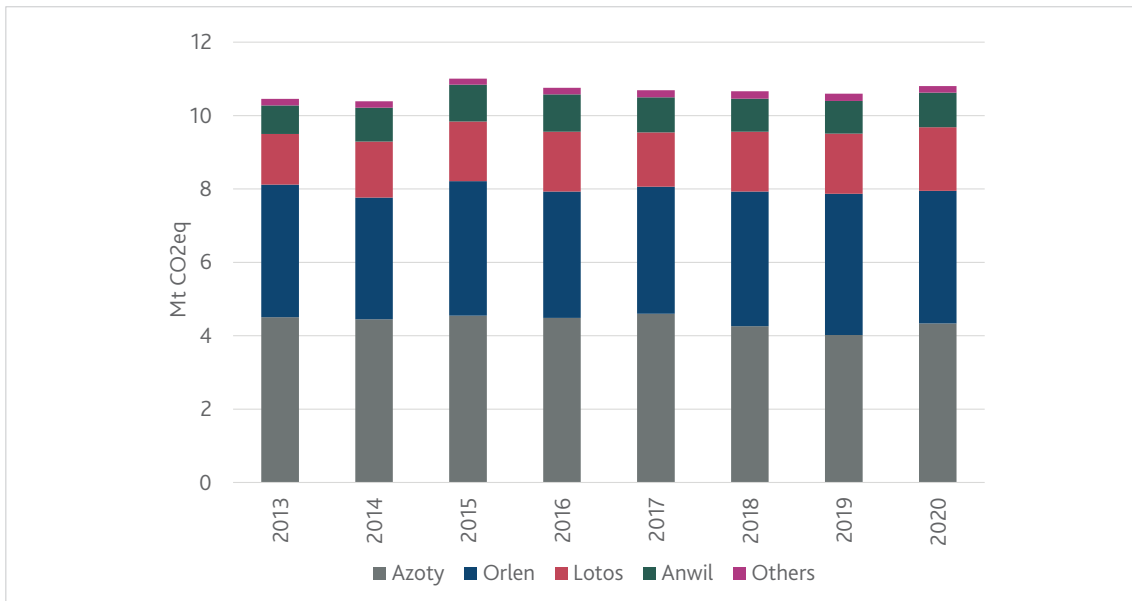
PKN Orlen is the largest Polish oil refining and retail group with well-integrated petrochemical and chemical production and moderate upstream operations in Poland and Canada. It has a solid presence in CEE, including the Czech Republic, the Baltic states and Germany. 27.5% of its shares are owned by the Polish Treasury.

Besides the petrochemical activities the company owns energy distribution, electricity and heat production capacities as well as a retail arm which operates gas stations. In recent years, Orlen has carried out expansion through the absorption of two other state-owned companies: Lotos (also from the oil and petrochemical industry) and ENERGA (a company that mainly owns power generation units).

Anwil is a fertilizer and plastics producer company owned by the Orlen Group since 2012.

Grupa Azoty operates in the mineral fertilizers, engineering plastics, Oxo alcohols and other chemicals sector. It is one of the largest producers of this type of products in Europe.

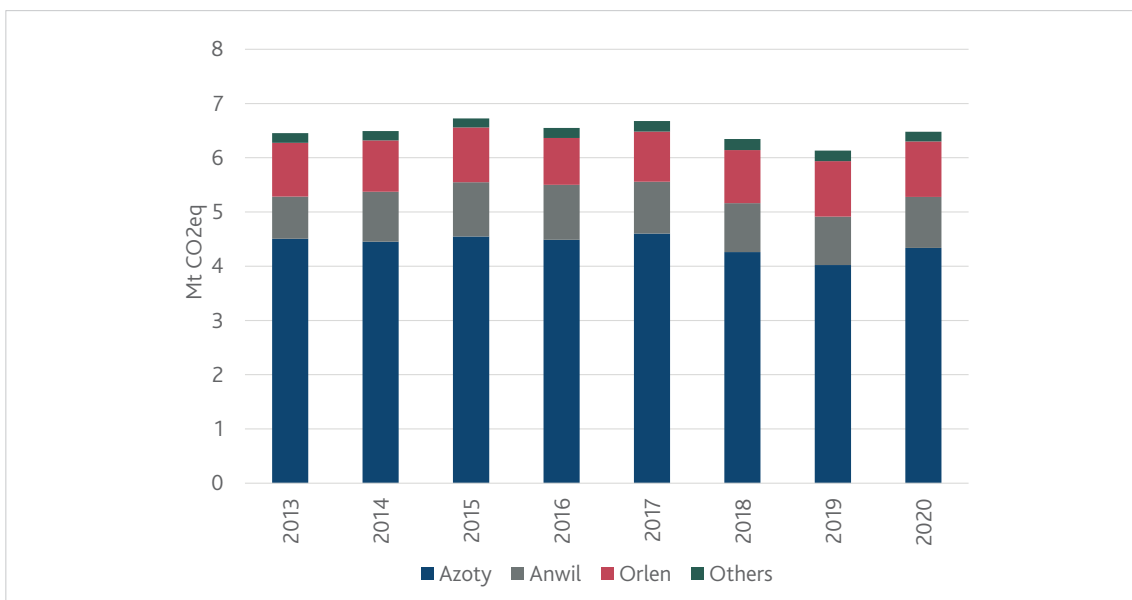
Figure 11. Emissions from chemical industry installations covered by the EU ETS by capital group (with oil refineries)



Source: EUTL data

When considering the sectoral activities and emissions, **Orlen** and **Lotos** are clear standouts as they also engage in oil refining activities (compare with **Figure 12**).

Figure 12. Ownership structure of the chemical sector emissions within the EU ETS (excl. oil refineries)



Source: EUTL data

The publicly available datasets (i.e. the companies' disclosures and the statistical databases) do not delineate emissions by product groups. Not only is the emission decomposition

flagging. Production levels for chemicals are not available. We provide a list of products by major companies in the **Table 11**.

Table 11. Chemical products supplied by main Polish capital groups in the chemical industry

Company	Upstream chemical product	
Grupa Azoty	Urea	Ammonium sulfate
	Ammonia	Melamine
	Titanium dioxide	Hydrogen peroxide
	Diesel exhaust fluid	Monocalcium phosphate
	Sulfuric acid	Potassium nitrate
	Phosphoric acid	Calcium nitrate
	Ammonium nitrate	Caprolactam
	Urea	
Orlen	Ethylen	Propylene
	Polyethylene	Polypropylene
	Toluene	Paraxylene
	Orthoxylene	Ammonium sulfate
	Ammonium nitrate	Polyvinyl chloride
	Purified terephthalic acid	

Source: Companies' annual reports

Climate protection goals

Table 12. Decarbonisation plans of Polish chemical companies

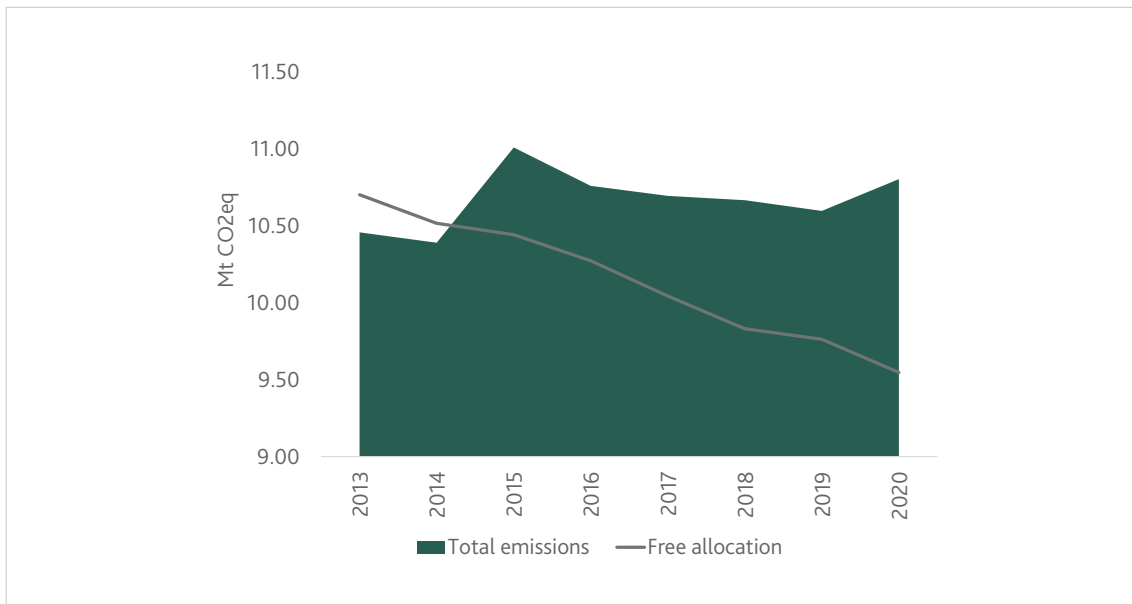
Company	Interim CO ₂ emission reduction targets	Climate neutrality goal	Considered low-carbon technologies		Planned investments
Orlen	-20% by 2030 (emissions reduction target both in refining and petrochemicals)	Yes, by 2050	Refining	Petrochemicals	Construction of a lactic acid unit
			<ul style="list-style-type: none"> • Efficiency improvement • Development of biofuels and alternative fuels (e.g. hydrogen) • Selective upgrades and configuration improvements • Continued efforts to maximize oil conversion • Significant increase in biofuel output, including second generation biofuels (HVO, co-HVO, UCOME, bioethanol from lignocellulose, biomethane) • Development of hydrogen production • CCUS applied to "dirty" hydrogen production 	<ul style="list-style-type: none"> • Expansion of basic chemicals and new advanced chemicals capacity • Chemical recycling (building foothold in sustainable development: recycling of plastics, development of waste-to-energy, plastics recycling capacity of 0.3-0.4m tonnes by 2030) • Biomaterials 	
Azoty	ND	ND	<ul style="list-style-type: none"> • Energy efficiency improvement (30% reduction target for energy intensity of steam methane reforming by 2030) • Green feedstocks • Renewables as alternative green energy sources • Green hydrogen, green ammonia 		Renewable energy unit at the Puławy plant R&D activities

Source: Publicly available sustainability reports and press releases

Barriers to decarbonization: financial or technological?

Freely allocated emissions have been on the slide (see **Figure 13**). They dropped by 11% since 2013 to reach 9.5 Mt by 2020. Meanwhile, the sector's emissions have been stable widening the gap that needs to be financed.

Figure 13. Share of free allowances in total emissions



Source: EUTL data

POLICY

Strategic approach to the issue of industry decarbonization

The Polish industrial policy lags behind in addressing green transition and decarbonization. Not only does it lack a comprehensive approach and strategic planning but the framework creates several additional barriers to decarbonizing the industries. The government entities would need to invest in knowledge generation to start fixing the legislation's loopholes which are currently hiding in plain sight.

First, there is a lack of strategic insight and vision on the central government's level. Importantly, the crucial problem underlying this issue is also the lack of a strategy for decarbonizing the entire economy, and thus the role the industry should play in these plans is not yet known. **National Climate and Energy Plan** envisions some policies and measures dedicated to industry, i.e. diversification of raw materials for the domestic chemical industry, reduction of unit energy consumption in industry by 20% as compared with 2018 and actions enhancing sustainable use of renewable resources in industry. However, industry decarbonisation is certainly not a government's priority. The strategies and policies regarding the issue come and go: the plans are being created but they will not have been implemented. The **Strategy for Sustainable Development** (the so-called "Morawiecki plan") would be a suitable example of this problem. The package of reforms included in Morawiecki plan consisted of a reindustrialization plan that targeted the heavy industries. However, similarly to the rest of the Strategy for Sustainable Development, it was never consistently and holistically carried out. Thus, it is clear that even though the government created several plans and policies for the industry, they were not changed and implemented into the existing laws.

The implementation of strategic documents is therefore inefficient. This is caused by the lack of governance procedures and implementation management, as well as monitoring indicators for these strategies as well as roadmaps. In 2022, "The Pathway to Circular Economy" should have been implemented, but the document still lacks a precise timeline with milestones and crucial reforms for businesses and organizations, and there is no communication campaign targeted at the stakeholders. Therefore, the awareness of the upcoming changes and policies is low.

Moreover, as there is no framework that would combine all of the policies that should make up a decarbonization strategy, it is difficult for the industry to find crucial information. That is especially important since there is no timeline of implementing the policies that are being described in different strategies.

The lack of strategic planning has its roots in the politicization of the topic of decarbonization. One document that planned to tackle the issue thoroughly and consistently is now still in the form of a draft. "Poland's Industrial Policy" is a strategic document that emphasized three main fields of transforming the industry: green transition, digitalization and competition. However, due to lack of political consensus and frequent personal changes in

the Ministries causing disruptions in the operating of national administration the “Poland’s Industrial Policy” is not being processed.

Furthermore, there are no cross-sectional policies and direct reforms dedicated to decarbonising the industry. Moreover, the activities that are being undertaken are fragmented, and they lack inter-ministerial cooperation and communication with local governments.

The lack of inter-ministerial cooperation leads to a crucial barrier that is an inconsistency in strategic documents and policies. Propositions from different documents can not only differ but also contradict each other. This creates a very serious barrier for the industry which requires long-term stability due to the long investment cycle.

The public consultation procedure is not used regularly and thus it does not ensure a diversity of views and the real participation of citizens and other stakeholders in the creation of strategies and regulations. Therefore, the existing documents lack a crucial insight that then substantiates a thorough analysis.

Poland’s strategies’ level of ambition regarding decarbonization is also much lower than the goals that are being presented by the European Union. This is certainly true for the issue of decarbonising the industry. The policies lack the level of ambition that is needed to ensure the success of decarbonisation and the green transition.

Gaps in the policy and regulatory environment

Since limited attention and importance are given by state authorities to the issue of industry decarbonization, policy framework in this area is underdeveloped and lacks in financial, legal and administrative tools dedicated to fostering green transition in industry, the examples of which are provided below. Some of them however already exist in insufficient form that may be a point of departure for a discussion on improving the policies for industry decarbonization.

Carbon contracts for difference (CCfD)

A form of state aid which could provide an important financial stimulus to greening industrial production by making green industrial products competitive in terms of price with fossil fuels-based industrial production. The general idea behind CCfDs is to cover the difference between the market price for selling free emission allowances within the EU ETS and the fixed effective carbon price agreed in the contract: the producer who manufactures green commodities is entitled to receive this difference from the state if the revenues from selling avoided emissions are below the fixed price; otherwise, it is the producer who pays the difference to the state. Although CCfDs are mentioned in Polish Hydrogen Strategy, no timeline is given when their implementation could be expected and no details are disclosed on how they would be functioning, which industrial branches they would be addressed to and which technologies they would promote.

Sector deals

In the Strategy for Responsible Development the concept of a sector deal was developed, mentioned later in Polish Hydrogen Strategy and Polish Industrial Policy. It is an agreement on cooperation between public entities and representatives of a particular industrial branch. The sector deal is to include a package of measures to provide stable regulatory and policy environment, and hence to boost investments, but not necessarily by providing state funding, but by building synergies between actors in the field of R&D, productivity, education and, last but not least, green transition in particular. However, no sector deal dedicated to steel, cement or chemical industry has been concluded so far, therefore the potential of this tool remains still unexplored and untapped.

Legal barriers to the on-site green electricity generation

In order to reduce Scope 2 emissions, industrial plants might switch to renewable electricity. This could be achieved by deploying self-owned green electricity sources (generation on-site) or choosing a supplier of green electricity through a cPPA (Corporate Power Purchase Agreement) contract. Major impediments are however met in Polish legal framework. First, the EU provisions on “direct line” (enabling an isolated customer to have its premises supplied with electricity by a given generation site) have been inefficiently transposed to Polish legal system (mainly because the permission by the President of the Energy Regulatory Office is required, which is issued only if a customer cannot be supplied via existing grid), and so far no “direct line” has been built in Poland. Moreover, it is hard to conclude a cPPA without the participation of the DSO (Distribution System Operator) – energy generated on site has to be injected into the grid first (according to the Polish energy law). Therefore, due to regulatory barriers, Polish industrial plants have limited possibilities of switching to green electricity.

Green (public) procurement

Polish public procurement law already provides for including green criteria in public competition calls, but the share of awards given solely because the offer was the cheapest one available is still high in Poland, i.e. on the level of 50%.¹⁰ Therefore, there is no massive green public procurement action driven by the state authorities, which could generate increased supply of green industrial products.

Lack of scheme for the transfer of revenues from the EU ETS

The funds raised through the sale of emission allowances on auctions organized by the EU Member States are at the government’s disposal and may be used for financing the decarbonization of industry, especially since EU law requires to spend at least 50% of revenues

¹⁰ “Public Procurement”.

from the auctioning of emission allowances within the EU ETS on climate action. However, as the report by ClientEarth Foundation shows¹¹, in 2013-2020 only 25% of this share was actually spent on actions allowed by the EU ETS Directive. Moreover, the final allocation of remaining 50% (which goes to the state treasury) remains unknown, as the mechanism of their distribution is non-transparent.

Current regulatory environment of green technologies for industry

Low interest of public authorities in the industry decarbonization translates not only into lack of sufficient incentives, which was discussed above, but also into barriers in the current legislation and policy, as the existing regulations have been passed without the strong aim to support the promotion of low and zero emission technologies in the industry.

Regulations on carbon capture and storage (CCS)

As for June 2022, Polish law allows for deploying CCS demonstration projects only, which for industrial plants (refineries, cement kilns, steel foundries) translates into the necessity of storing at least 500 kilotons of CO₂ per year. Demonstration project also has to implement the full chain (capture, transport and storage). These requirements might be excessive, given the immaturity of a full-scale CCS technology – at this stage industrial plants might prefer to implement small pilot projects, limited for example to the one part of a CCS value chain, in order to verify the viability of the CCS installation, which is currently impossible in Poland.

Moreover, there are also particular barriers to CO₂ transport and storage. Although there is proved significant geological capacity of inland deep saline aquifers for storing CO₂, storage sites can be located only in a confined area in the Baltic Sea, which means higher costs of CO₂ transport for industrial plants located in the south of Poland. And transport is also preferred in the form of transmission via pipelines. Polish regulations on emission trading recognizes emissions captured and stored with the use of CCS as avoided emissions (for which one does not need to buy an emission allowance within the EU ETS) only if captured CO₂ has been transported to the storage site via pipeline.

Regulatory environment of hydrogen use

Polish regulations on hydrogen are still in the making. Although there are some provisions on hydrogen use, they apply to the transport sector only. However, as announced in the Polish Hydrogen Strategy, a separate, cross-cutting legal act on hydrogen is to be passed by the parliament, possibly in the second half of 2022. Without separate regulations, hydrogen use would fall under regulations on “substances” or “gaseous fuels”, which were designed

¹¹ ClientEarth (2022), „Kreatywna księgowość. Jak Polska marnuje środki z EU ETS” (“Creative accounting. How Poland wastes revenues from the EU ETS”).

for natural gas in particular, whereas hydrogen needs preferential treatment, especially at an early stage of development of hydrogen economy.

FINANCIAL BARRIERS

When it comes to directing finance flows towards industry decarbonisation, the main, preliminary issue is whether Polish industrial companies are willing to reduce CO₂ emissions, and, if yes, whether they are aware of the available funding opportunities, or prepared to receive this funding, e.g. in a form of debt.

Polish industrial companies eligible to receive funds from European institutions

If the applications submitted to the EU under the Innovation Fund are considered, one should deduce that there is a low interest in receiving funds for decarbonisation or a little awareness of external financing opportunities among Polish industrial companies – in Poland the rate of applications to the Innovation Fund per country (approx. 5 in the case Poland) is not very high compared to the Western EU countries (on average more than a dozen)¹². As a result, only one Polish project from sectors covered by this Report was selected for a grant preparation phase – GO4ECOPLANET by Lafarge, a project that aims to create an end-to-end CCS chain starting from CO₂ capture and liquefaction at the Kujawy cement plant¹³. This example proves, however, that Polish industrial companies are eligible to receive funds for decarbonisation within the European framework, and not only under EU funding schemes, but also from European development banks (i.e. European Bank for Reconstruction and Development and European Investment Bank). This view is even strengthened by the latest EUR 180 million loan given by European Investment Bank to PKN Orlen, Polish leading petrochemical company, that will help finance the company's new activities in bio-refinery and bio-chemical production¹⁴.

Financial situation of Polish cement, steel and chemical companies is stable and allows for green investments.

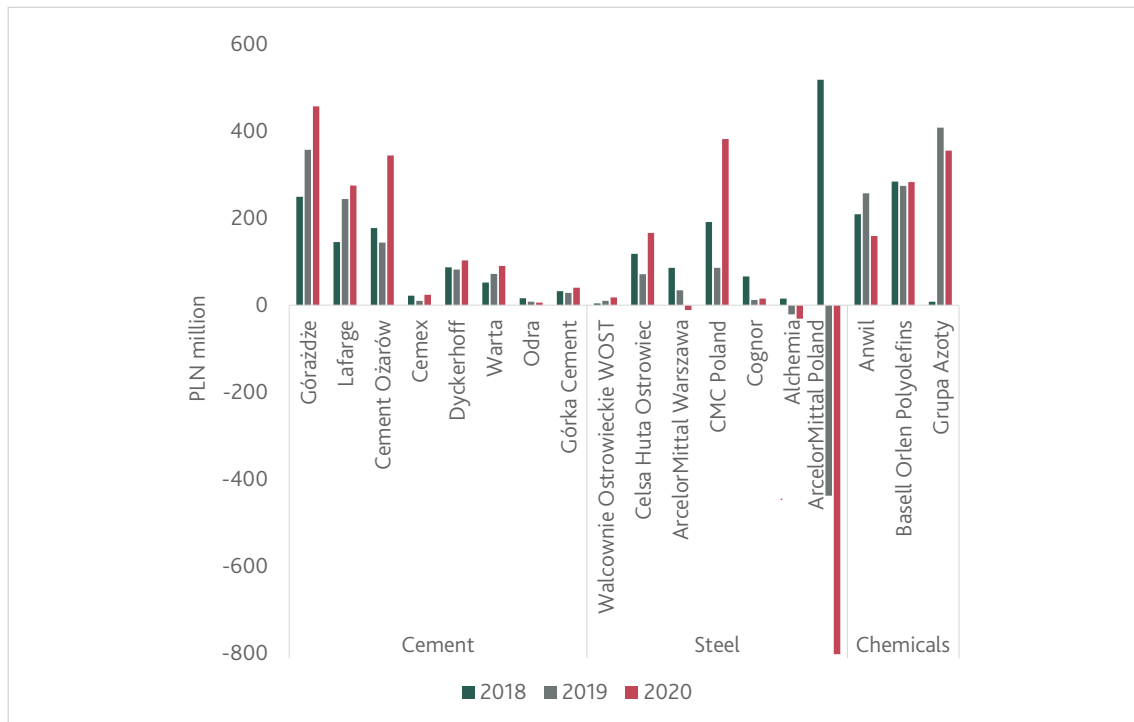
When it comes to solving the issue of preparedness of Polish cement, steel and chemical companies to carry out the decarbonisation, one must take a closer look on their financial statements (see **Figure 14**).

¹² “€1.5 billion for clean tech: 138 projects apply to the EU Innovation Fund's second call for large-scale projects”.

¹³ “Innovation Fund second call for large-scale projects. List of proposals pre-selected for a grant”.

¹⁴ “Poland: PKN Orlen receives EIB €180m loan to support its decarbonisation plans”.

Figure 14. Net profit generated by Polish cement, steel and chemical companies



Source: Financial statements submitted to the National Court Register

The hard-to-abate industrial sector covered by this Report stays firmly profitable. The cement companies are a clear standout i.e. Górażdże Cement (owned by Heidelberg Cement) and Lafarge Poland while the chemical sector also brokered solid gains. Net profit is, however, only a part of the big financial picture, but even though these profits might be insufficient to finance the decarbonisation on one's own, they might help the companies position themselves as reliable creditors the banks, especially given the changing approach of the banking sector to sustainable investments (which is elaborated in detail in the chapter below on private finance).

In this context the financial situation of the Polish branch of ArcelorMittal continues to accumulate losses as we observed for 2019 and 2020. ArcelorMittal's installations play a pivotal role in Polish steel production (it is responsible for almost 90% of emissions from steel production under the EU ETS). However, the Polish branch of ArcelorMittal is a part of a large, multinational company which, probably, can provide financial support if needed.

Polish cement, steel and chemical companies are not concerned enough about their environmental footprint. However, access to finance will be also preconditioned by meeting ESG criteria by the companies applying for funding to commercial institutions. The largest companies (e.g. with more than 500 employees) are already obliged to submit non-financial

reports under the NFRD Directive¹⁵ implemented to Polish law. The so-called sustainable development reports have been published by, e.g. the Polish branches of Cemex¹⁶, Heidelberg-Cement (Góraźdże Cement)¹⁷ and Arcelor Mittal¹⁸. In these documents the strategy of decarbonisation is outlined – this is an important information for banks when deciding on reward of credit financing. However, this is not a common practice since only approx. 14% of Polish companies submitting non-financial reports mentioned any initiative to reduce emissions¹⁹. Moreover, only 8 Polish enterprises joined Science Based Targets initiative²⁰ which requires to take a clearly-defined pathway to reduce greenhouse gas (GHG) emissions via setting climate targets, which are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement). For example Orlen, Polish leading petrochemical company, paves the way for other companies in terms of sustainability, as it integrates ESG factors in its strategy by, i.a., aiming to set emission reduction targets by 2030 and developing an approach to Scope 3 CO₂ emissions²¹.

Polish steel, cement and chemical companies must however in general improve in this aspect if they want to successfully compete for finance.

Sources of finance

Investment needs in industry account for a marginal share of Polish GDP

As far as decarbonisation costs are concerned, investment needs in industry are estimated to amount to EUR 30-60 billion (the expenditure above EUR 30 billion, understood as “additional expenditure”, is the expenditure above the assumptions made in the NECP), i.e. 0.1%-0.2% of the total GDP generated in 2020-2050 under different scenarios outlined in the NECP, in the Energy Policy of Poland until 2040 (PEP2040) and developed by McKinsey²²

¹⁵ Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups

¹⁶ Cemex Polska, „Raport zrównoważonego rozwoju 2015-2016” (“2015-2016 Sustainability report”)

¹⁷ Góraźdże Heidelberg Cement Group, „Raport zrównoważonego rozwoju 2016-2017” (“2016-2017 Sustainable development report”)

¹⁸ Arcelor Mittal Poland, „Raport zrównoważonego rozwoju 2020” (“2020 Sustainable development report”)

¹⁹ Climate Strategies Poland (2022), “Better late than later”

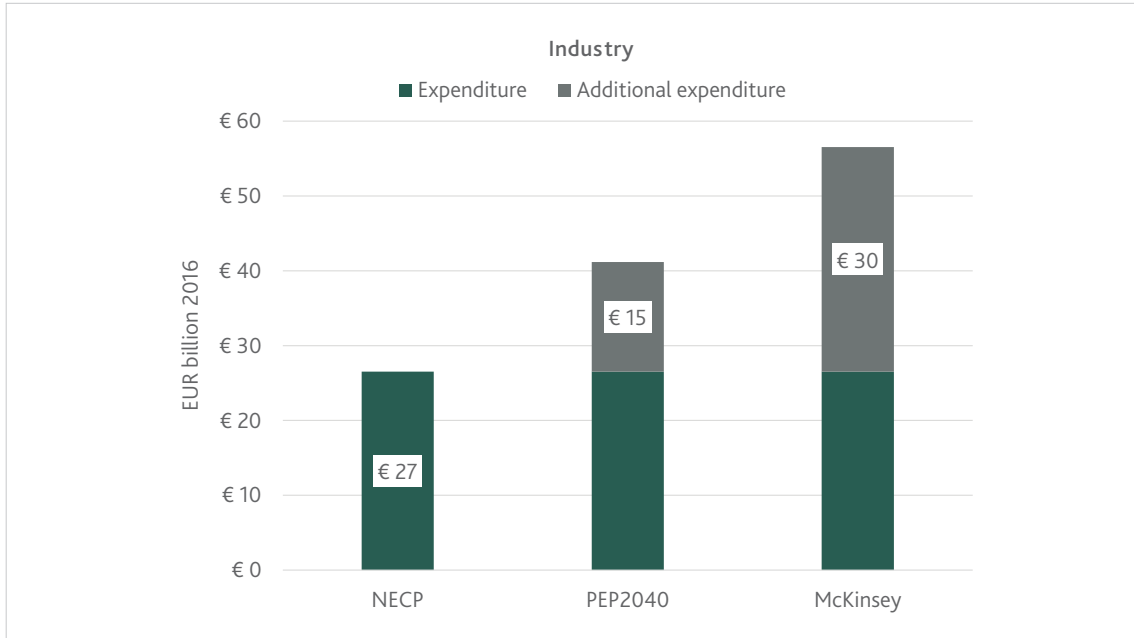
²⁰ Ibid.

²¹ Orlen Group Integrated Report 2021

²² McKinsey (2020), “Carbon-neutral Poland 2050”

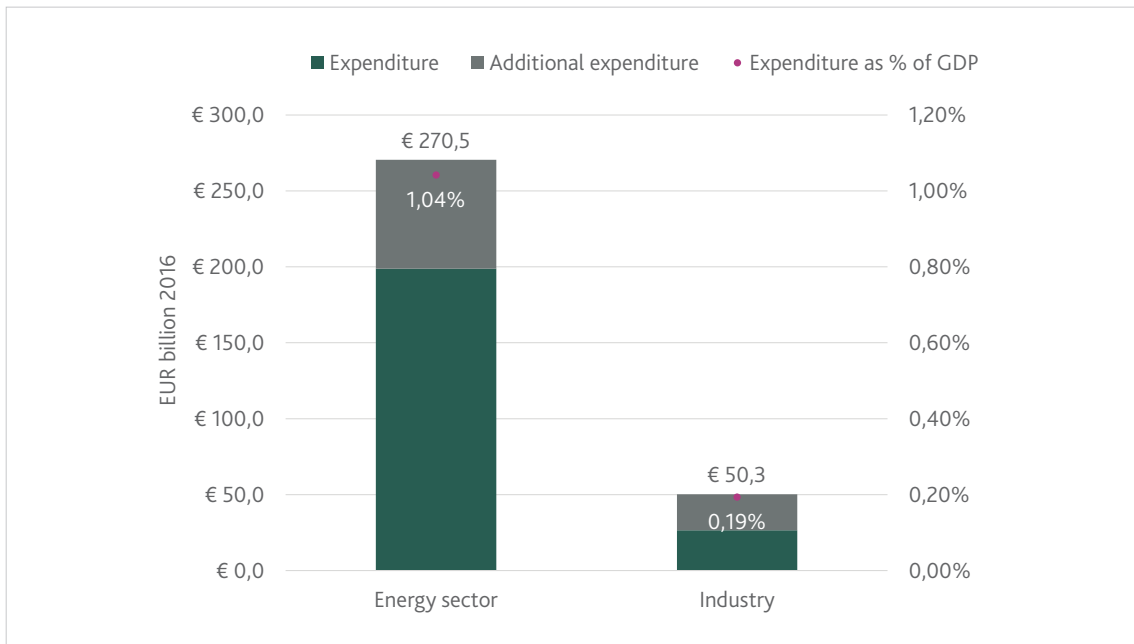
(see **Figure 15** and **Figure 16**). These estimates were made by WiseEuropa based on McKinsey and PEP2040.

Figure 15. Investment needs in Polish industrial sector on the pathway to climate neutrality by 2050



Source: WiseEuropa based on NECP, PEP2040 and 'Carbon-neutral Poland 2050' by McKinsey

Figure 16. Expenditures for the transition of the energy and industrial sector



Source: WiseEuropa based on NECP, PEP2040 and 'Carbon-neutral Poland by 2050' by McKinsey

Since the decarbonisation of electricity consumption by industry falls under the decarbonisation of the energy sector, the calculated investment needs for the industrial sector, presented above, cover to a largest extent the expenditures in hard-to-abate sectors, i.e. cement, steel and chemicals, where the decarbonisation must be conducted via the transformation of the production process rather than phasing out fossil fuels in the energy production.

Public finance might be not sufficient to cover investment needs in cement, steel and chemicals

Both Polish funds and the European Union's allocations within the EU funds are mostly unconcerned about the decarbonization of the above-mentioned industries. There are numerous funds aimed at the green transformation and decarbonization but process emission reductions are not in the focal point.

National Energy and Climate Plan for 2021-2030 – that is the key strategy of the Polish government in the context of the energy transformation and decarbonization – lists several sources of funding opportunities:

- National Plan for Recovery and Resilience
- ETS revenues
- EU funds
 - LIFE
 - Invest EU
 - Connecting Europe instrument
 - Operational programs from the 2021-2027 financial framework
 - Modernisation Fund
 - Just Transition Fund
 - and Innovation Fund, (although it was not yet mentioned in the NECP)
- National Fund for Environmental Protection and Water Management (NFOŚiGW) funds.

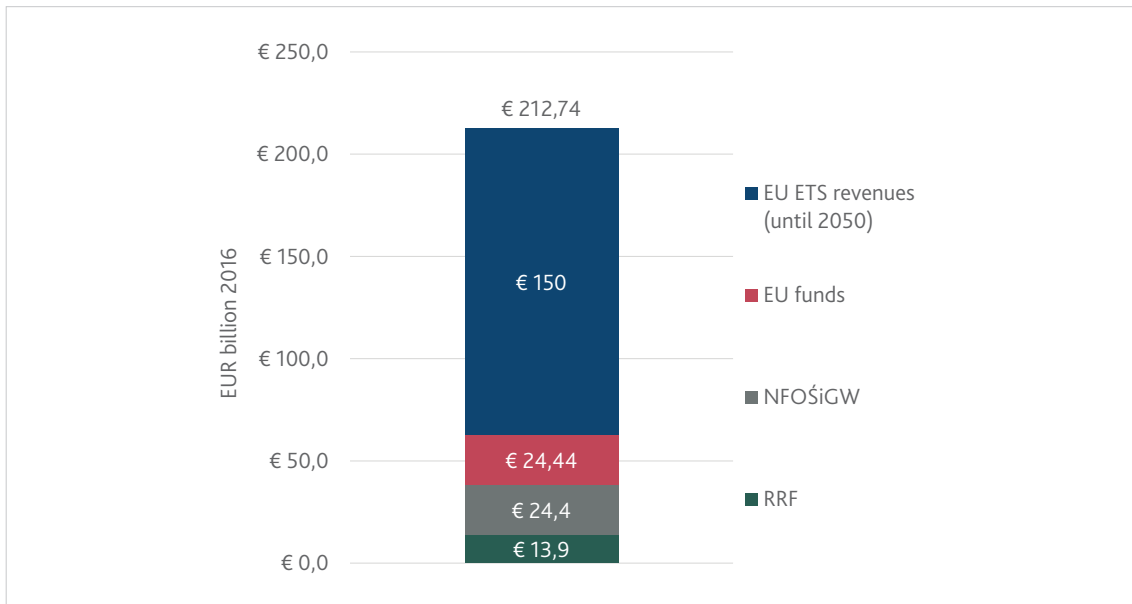
The funds, however, focus mostly on the issue of energy transition, and not on the topic of industry decarbonization. And there are almost no relevant opportunities that directly target the process emission industries in our scope.

To that we can add that the available financial means are not supporting the decarbonisation efficiently, as for example revenues ETS auctions are not used in-line with legal obligations resulting from the EU ETS directive. The provided expenditures in industry sector in the Recovery and Resilience Plan (endorsed by the European Commission on 1st of June 2022), which can be spent on the decarbonisation of industrial processes, are included in the A.2.2.1. action, i.e. investments in the deployment of environmental technologies and innovation, including those related to circular economy. EUR 162 million is allocated within this fund, which corresponds to 3.4% of the total allocation on category A – “Resilience and competitiveness of the economy” and to 1.07% of the total allocation on “climate contribution”. The lack of one strategic document related to the decarbonisation of industry (discussed in

previous chapter) at the national level with planned allocation of financing is only adding to the problem of low level of ambition in other documents.

We have estimated how much of available public funds could be mobilised to finance the decarbonisation of both energy and industrial sector (see **Figure 17**)

Figure 17. Expenditures in the energy and industrial sector: sources of finance



Source: WiseEuropa based on NECP, PEP2040 and 'Carbon-neutral Poland 2050' by McKinsey

Unjustified expenditure of funds under the EU ETS – a threat to filling the investment gap

Since the revenues from the EU ETS are expected to be the most important source of finance for the decarbonisation of industry, the misallocation of funds from the EU ETS by the Polish government, proved by the Warsaw-based branch of the Client Earth foundation²³, is a burning issue, as it results in the waste of substantial funds which could be more efficiently spent on the decarbonisation of industry.

The 'Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union' (with amendments, hereinafter referred to as: **EU ETS Directive**) states that "at least 50 % of the revenues generated from the auctioning of [emission] allowances (...), or the equivalent in financial value of these revenues²⁴" should be used for a dozen of allowed activities, among which there are initiatives relevant to the decarbonisation of industry, such as:

²³ ClientEarth (2022)

²⁴ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC, article 10 (3)

- the development of RES, as well as the development of “other technologies that contribute to the transition to a safe and sustainable low-carbon economy”²⁵;
- “the environmentally safe capture and geological storage of CO₂, in particular from solid fossil fuel power stations and a range of industrial sectors and subsectors”²⁶;
- “research and development in energy efficiency and clean technologies in the sectors covered by [the] Directive”²⁷, i.e. including cement, steel and chemicals.

However, as the Client Earth foundation highlights, in 2013-2020 three-fourths (i.e. approx. EUR 3 billion in total within the 2013-2020 period, which amounts to less than 1% (0,7%) of state budget revenues in 2020) of these 50% of the revenues from the auctioning of emission allowances have been spent on the activities not allowed by the EU ETS directive that may be even considered as contradictory with the purpose of this Directive, e.g. on the exemptions from excise tax on electricity generated from RES. Although somehow associated with RES, the funds allocated to the “exemptions from excise tax on electricity generated from RES” are just transferred to the state budget in order to compensate the loss in state revenues and they may be further distributed in any way – and it is impossible to determine whether they financed activities aimed at reducing CO₂ emissions.

As a result, funds that could support the industrial companies in their decarbonisation efforts, have been wasted. Thus, in the future they should be better distributed through funding programmes launched by the government and dedicated to the industrial sector.

Private finance has been so far dominated by bank credits

Given that the investment needs for, jointly, the energy and industrial sector, amount to approx. EUR 320 billion by 2050, and public finance can provide, according to our estimations, approx. EUR 213 billion, the gap of approx. EUR 100 billion emerges which could be filled with the funds provided by private investors. Actually, Polish financial system is characterised by the dominant role of bank credit among external sources of financing for non-financial entities, and the actual level of equity instruments is marginal²⁸. However, due to high interest rates resulting from the current anti-inflation policy, bank credits become less promising source of finance, which might be an important barrier to financing industry decarbonisation.

²⁵ Ibidem, article 10 (3) (b)

²⁶ Ibidem, article 10 (3) (e)

²⁷ Ibidem, article 10 (3) (g)

²⁸ Korzeb Z., Niedziółka P. (2022), “Financing of fossil fuel companies by Polish banks”

Approach of financial institutions

Public sector yet in transition to the “sustainable finance era”

The Polish governmental Capital Markets Strategy until 2023, the main goal of which is to improve access to financing for Polish companies, contributing to the long-term development of the economy, and for the Polish capital markets to become a financing hub for the Central Europe's companies and start-ups, has been issued in 2019. Sustainable finance was not strongly present in the Polish debate at that time and for this reason the document is not centred around this issue. The strategy, however, assumes educational and promotional efforts, and the development of green financial instruments such as green bonds and low-carbon benchmarks. A separate, national, governmental sustainable finance strategy for the Polish market is in the making²⁹.

Therefore, ESG-related investments are not tracked yet by a regulator and no guidelines are provided in this matter to supervised institutions. Moreover, the financial regulation sets no requirement to report on carbon footprints of portfolios and includes no other incentives for greening portfolios. To make things worse, the non-financial reporting regulation does not provide for the verification of the quality of the non-financial reports by auditors – the auditors only confirm whether a non-financial report has been prepared, if required for a given company. This translates into low quality of non-financial reports, which results in hampering financial flows from sustainability-oriented investors to Polish companies.

Polish Ministry of Finance, however, is a member of the Coalition of Finance Ministers for Climate Action (which however does not have to translate into particular actions, although the Coalition's commitment to climate action is guided by 6 principles). In addition, BGK, Polish state development bank, is currently in the process of adapting to comply with the EU Taxonomy Regulation and international ESG requirements, as it aims to improve its ESG rating, although the move away from financing coal-based sectors of the economy has not been announced yet.

This is of particular importance, as the COVID-19 crisis provided prospects for Polish public finance institutions (e.g. BGK) to generate large amounts of funds, if needed. Public aid programmes implemented in order to soften the influence of the pandemic on the economy amounted to more than PLN 100 billion (approx. EUR'21 22 million, i.e. approx. 4% of Polish annual GDP), which demonstrates that Polish public finance bodies are fully capable, both operationally and financially, of co-financing the emerging needs in the economy, e.g. those related to low-carbon transition, but the entities like BGK must become aware of these needs and be eager to finance them.

²⁹ “Poland initiates work on a roadmap for the development of sustainable finance in the country”.

Financial instruments focused on green energy – industry decarbonisation is still out of scope

The Polish government issued the first ever sovereign green bond in 2016 (EUR 750 million) and continued issuing more in 2018 and 2019. However, according to Polish Green Bond Framework³⁰, the proceeds from state green bonds are allowed to be spent on “eligible sectors” only, i.e.: renewable energy, clean transportation, sustainable agricultural operations, afforestation, national parks and reclamation of heaps – industry decarbonisation itself (e.g. decarbonisation of industrial processes other than through electrification with the use of renewable electricity) is out of scope and does not qualify for green label.

Instruments issued by private entities also ignore the issue of decarbonization of industrial processes. For example Orlen, a petrochemical company which should be concerned with this problem, envisions that the proceeds from green finance instruments (which might be substantial, given that in May 2021 Orlen issued 5000 green Eurobonds with a total value of EUR 500 million³¹) can be used to finance renewable energy, clean transportation and pollution prevention and control, but not green technologies in petrochemical industry³².

Polish capital market is immature, but has a great potential

Polish capital market, although young and immature, is quite developed when compared to other ones in the region. The capitalisation of the Warsaw Stock Exchange (EUR 144 billion) is higher than of its Austrian, Romanian, Czechian and Hungarian counterparts. Poland is also the main beneficiary of venture capital and private equity funds in the region; moreover, crowdfunding platforms are undergoing a fast development³³. All this translates into a high potential of Polish private capital market to gather enough funds to finance the low-carbon transition and, particularly, industry decarbonisation.

³⁰ Ministry of Finance (2016), “Green Bond Framework”

³¹ Orlen Group Integrated Report 2021

³² Orlen (2021), “Green Finance Framework”

³³ „Budowa regionalnego centrum zrównoważonych finansów w Polsce”.

Low engagement of private stakeholders

However, this potential remains unused so far. As the report Corporate Indifference³⁴ by Polish think-tank InStrat proves, Polish capital market is not yet enough concerned about ESG and sustainability. For example, no Polish investor takes part in Climate Action 100+ initiative.

Private banks are on the course to sustainability

In 2017, loans for the implementation of pro-ecological investments were offered by only three banks: BOŚ, BNP Paribas and Pekao. Today (as of 2022), they are offered by commercial and cooperative banks. One may thus think that banks are prioritizing the projects that are environmentally friendly, sustainable, and that target the issue of decarbonization.

However, most of the special tools offered by the private banks are not directly dedicated to decarbonising the industry. Usually, they take the form of the loans for the implementation of pro-ecological investments in general. Moreover, private banks are not yet working fully within the framework of the EU Taxonomy: for that, they are seemingly waiting for the whole Taxonomy to be implemented.

Nevertheless, the situation is dynamic. Pekao, one of the biggest Polish private banks (although owned by the State Treasury) has recently announced that in 2021-2024 it will provide at least PLN 30 billion for new sustainable projects (PLN 22 billion are to be obtained through the issuance of ESG-related bonds). As a result, the share of green finance (including e.g. investments in wind farms, photovoltaic installations, low-emission transport – green investments in industry are not directly mentioned) is to account for 4% of the bank's portfolio³⁵.

Polish private banks and corporates have also issued several green bonds, the latest being mBank which issued for EUR 500 million focusing on Renewable Energy, Energy Efficiency, Pollution prevention and control, Clean Transportation and Green Buildings. Since January 2020, Polish organisations issued approximatively USD 1.5 billion of green bonds, which is relatively limited compared to leading EU countries in green and sustainability bond issuance.

Moreover, Polish private banks are moving away from financing coal-related investments. Based on annual reports for 2020, 9 Polish leading commercial banks (out of 12 taken into consideration) declared a move away from financing coal-based sectors of the economy³⁶.

³⁴ Iwanowski, D., Stefaniak S. (2021), "Corporate indifference. Climate pledges and strategies of companies listed on the Warsaw Stock Exchange", InStrat.

³⁵ „Strategia ESG Banku Pekao: odpowiedzialny bank wspierający zrównoważony rozwój” (“ESG Strategy of the Pekao Bank: a responsible bank which supports sustainable development”).

³⁶ Korzeb Z., Niedziółka P. (2022)

In case of difficulties with mobilising enough finance or insufficient capitalisation of Polish banks, a substantial financial leverage could be provided by European Bank for Reconstruction and Development. It already provided the Polish branch of BNP Paribas with PLN 450 million green loan to support residential energy efficiency and invested EUR 38.7 million equivalent in a subordinated bond issued by Bank Millennium S.A. and hence increased MREL-eligible funding base of the bank.

CONCLUDING REMARKS

Key barriers to financing industry decarbonisation in Poland are:

- 1) Industry decarbonisation is not yet recognized as a beneficiary of sustainable finance instruments;
- 2) Spending revenues from the EU ETS on the activities not related to the low-carbon transition;
- 3) Public finance sources might not be sufficient;
- 4) Low engagement of private investors;
- 5) Public sector does not provide enough stimuli yet to mobilise necessary capital flows;
- 6) Polish industrial companies do not compete en masse for finance for decarbonisation;
- 7) Polish industrial companies perform poorly (in general) in non-financial, ESG-related reporting.