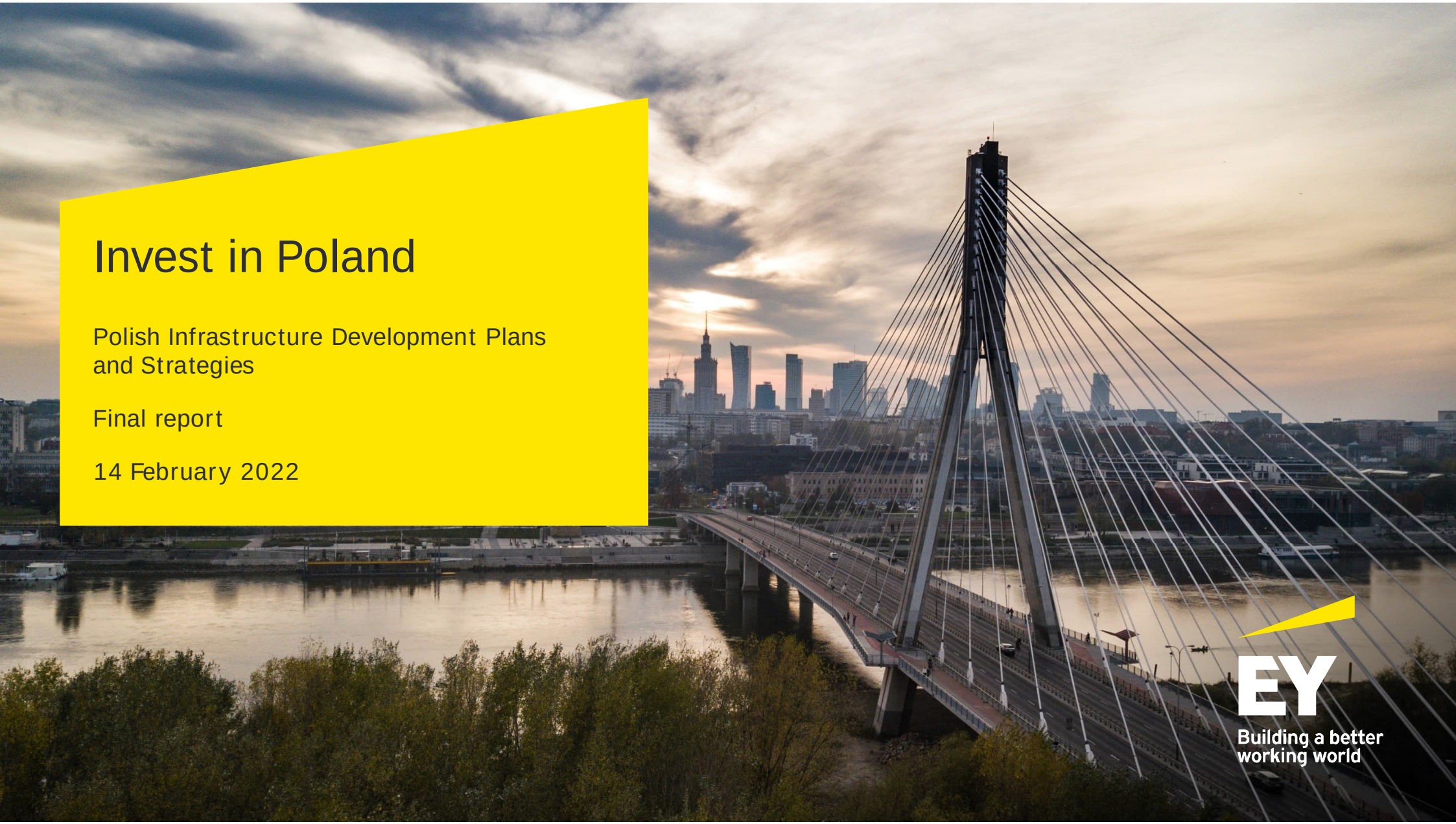


Invest in Poland

Polish Infrastructure Development Plans and Strategies

Final report

14 February 2022

Building a better working world

Foreword by the Japanese Embassy in Poland

Ambasada Japonii w Polsce
在ポーランド日本国大使館

ポーランドはヨーロッパ有数の親日国であることや、２００４年のＥＵ加盟後の順調な経済成長などを背景に、投資対象として熱い視線が注がれており、ＥＵの補助金を活用したインフラ整備や魅力的な投資優遇策などにより、投資先としての魅力が高まっています。一方で日本の潜在投資家が、ポーランドの経済情勢や投資機会に関する最新情報を入手する機会は決して多くないのが現状です。

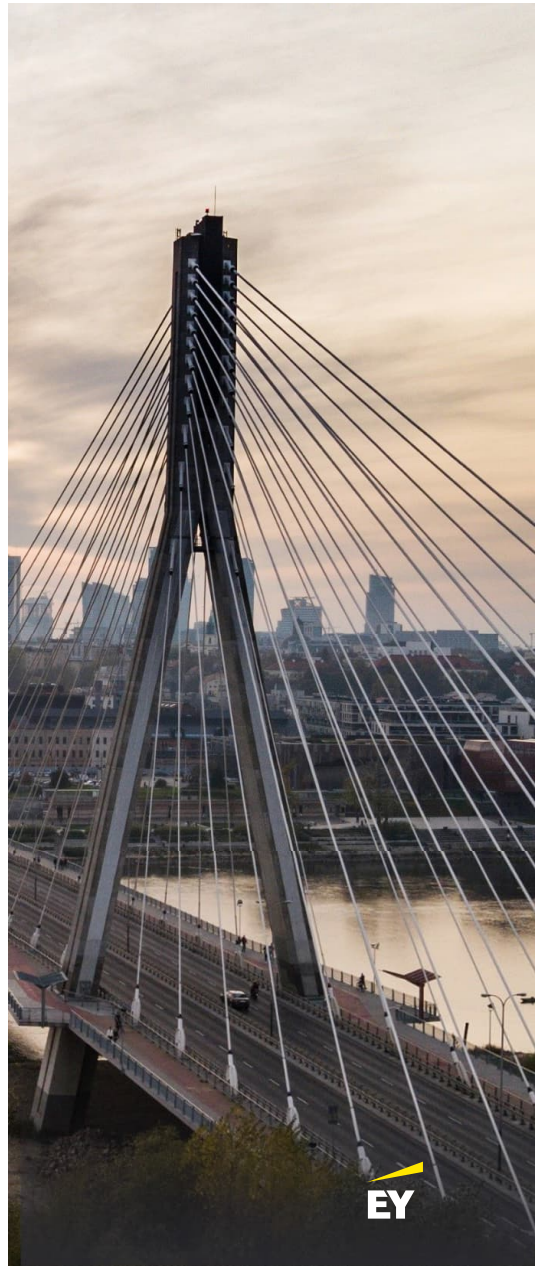
上記の背景を受け、令和３年度インフラアドバイザー事業として、在ポーランド日本国大使館がＥＹポーランドに委託し、今般、ポーランドの全般的な経済情勢に加えて、特に日系企業の参入機会が多いと見込まれるインフラ投資分野に焦点を当てた報告書を作成しました。

ぜひ本報告書をご覧いただいて、多くの企業の皆様がポーランドについて関心を持ってポーランドへの投資をご検討頂き、今後、両国の経済協力が発展することを強く願っています。

Poland is one of European countries which are friendly to Japan. It is gaining more attention among investors as an attractive investment destination thanks to infrastructure development by using EU subsidies and fascinating investment incentives, backed by its firm economic growth after joining EU in 2004. However, there are not much chance for Japanese potential investors to get the latest information on Polish economic situation and investment opportunities.

In response to the situation above, EY Poland, sponsored by the Embassy of Japan in Poland under its Infrastructure Advisor Project, prepared the report focused on not only Polish economic situation but also the infrastructure investment projects which are expected to have many opportunities for Japanese companies to enter.

By presenting this report, we strongly hope that many Japanese companies will be interested in Poland and consider investment there, so as to enhancing economic cooperation between Poland and Japan even further in the future.



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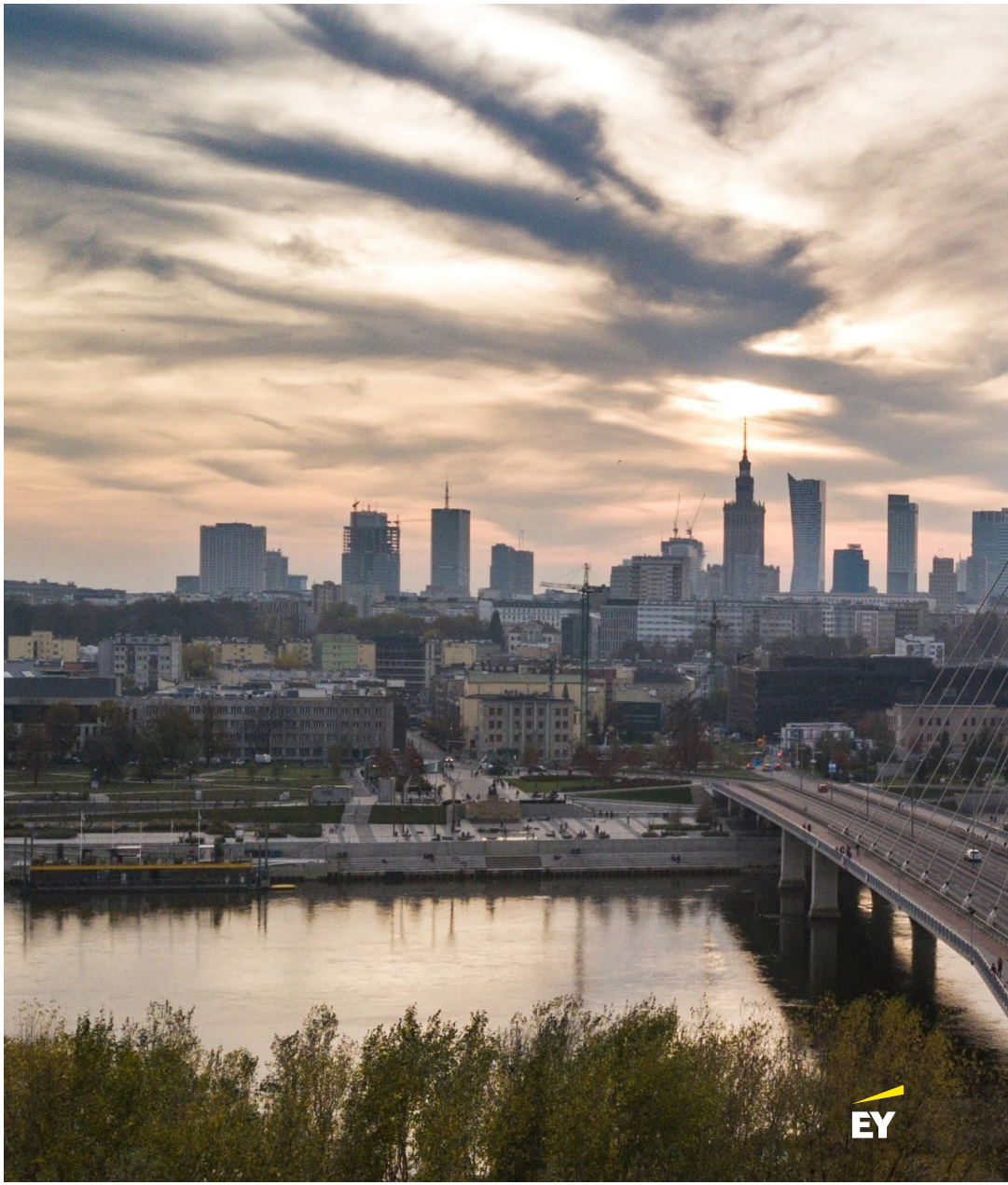


1

Introduction

Introduction

The objective of the report is to present Poland's most important investment plans in the infrastructure sector. The investment programmes and projects adopted by the Polish government are presented with regard to their main objectives, the value of capital expenditure, the main stakeholders and the advancement of their implementation.

The presented investment plans were selected in advance in terms of the possibility to involve private partners in their implementation.

The report is divided into 5 chapters. The first addresses Poland's socio-economic conditions, presenting its main investment strengths, the processes and trends the country is currently facing.

Chapter 2 presents government programmes that determine the directions of national and EU funds allocation in Poland. The report also contains references to the Three Seas Initiative and the effects that this investment initiative is expected to have on the participating countries. The last chapter presents selected investment projects in 4 main areas: transport, energy, IT & telecommunications.

The report presents general assumptions in accordance with the state of knowledge on the date of presentation of the report. Therefore, in many areas it may change and become more precise in the future.

For the most up to date information please contact our sector experts. Contact details are on the last slide of the Report.

Key figures

Total value of investment expenditures for infrastructural projects in European Funds for Infrastructure, Climate, Environment programme

€25b

Total value of investment expenditures estimated for infrastructural projects in the Three Sea initiative

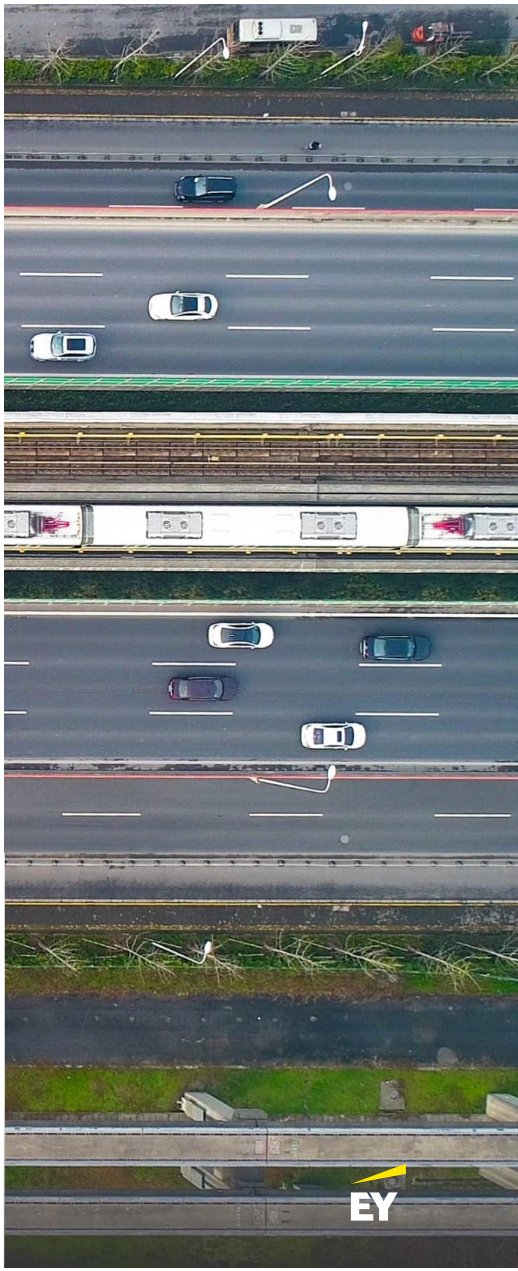
€290b

Total value of investment expenditures in the National Recovery Plan for 2021-2026

€35.97b

Total value of CAPEx on Solidarity Transport Hub and complementary investments

€7.7b



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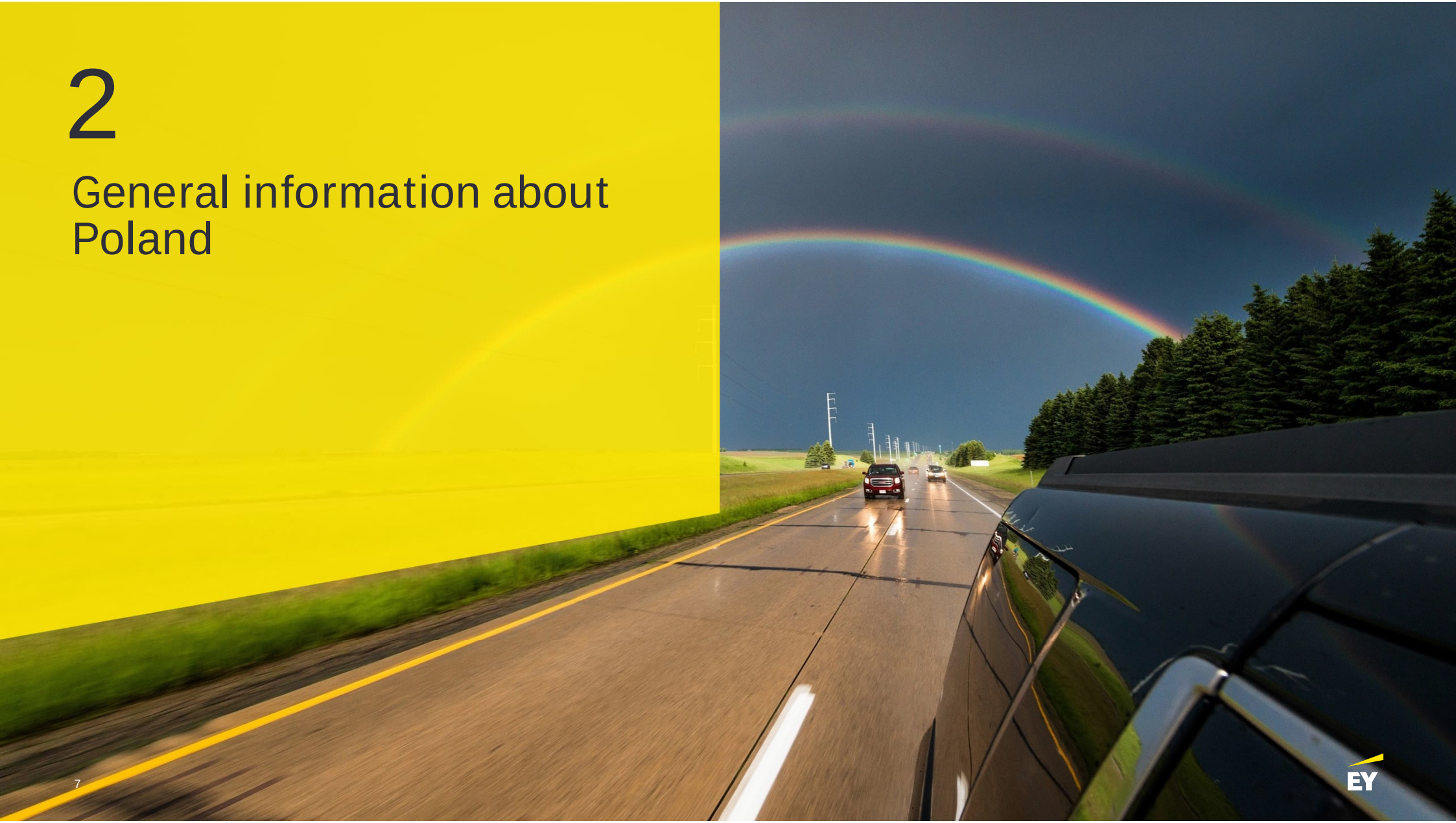
General information about Poland



General information about Poland | Introduction

01 | Introduction to the chapter

This chapter presents general information describing Poland in comparison with other EU and OECD countries. Social, infrastructural and economic indicators are presented. The chapter also includes content about selected important people from Poland.

02 | Geography

The chapter focuses on presenting the key geographical conditions of Poland, including those related to infrastructure and the dynamics of its quality improvement in recent years.

03 | Key metropolitan areas

The main metropolitan areas in the country, which include Warsaw, Silesia, Krakow, Gdansk, Lodz, Poznan, Wroclaw, Szczecin and Rzeszow, are described in detail.

02 | Economy

The chapter contains an analysis of the macroeconomic conditions in Poland and a general description of possible investment incentives for foreign investors (known as the Polish Investment Zone), including those based on the Polish Deal – the recently approved government policy.

General information about Poland | Geography

Poland is located in Central Europe, in the basins of the Vistula and Oder rivers, which flow into the Baltic Sea.

It borders Germany to the west, the Czech Republic and Slovakia to the south, Belarus and Ukraine to the east and Russia (Kaliningrad District) and Lithuania to the north.

Due to its location, Poland can benefit from convenient transport connections. Two important transport routes of the TEN-T* network run through its territory:

- North Sea-Baltic Sea Corridor, which connects Northern sea ports with Helsinki, via Berlin, Warsaw, Lithuania, Latvia and Estonia
- Baltic-Adriatic Corridor, which connects the Polish Baltic coast with Adriatic ports in Slovenia and Croatia, via the Czech Republic, Slovakia and Austria.

Poland is also located on the Via Carpatia transport route, which is the result of cooperation within the framework of the Three Seas Initiative. Despite being a lowland country it has mountain ranges that cover the southern border belts of the country: Sudetes and Carpathians.

Poland is a country with 38 million inhabitants, the 5th most populated country in the EU. It is also the 6th biggest country in the EU with an area of 312 km^2. The population density of the country is 123 inhabitants per km^2 and is higher than the average for EU and OECD countries.

Poland's settlement structure is very distinctive, as the main urban centres are located octagonally, with the metropolitan areas of Poland's capital Warsaw and Łódź at its centre. The largest Polish metropolises also include Silesia (with its capital in Katowice) and Tricity (Gdańsk-Sopot-Gdynia).

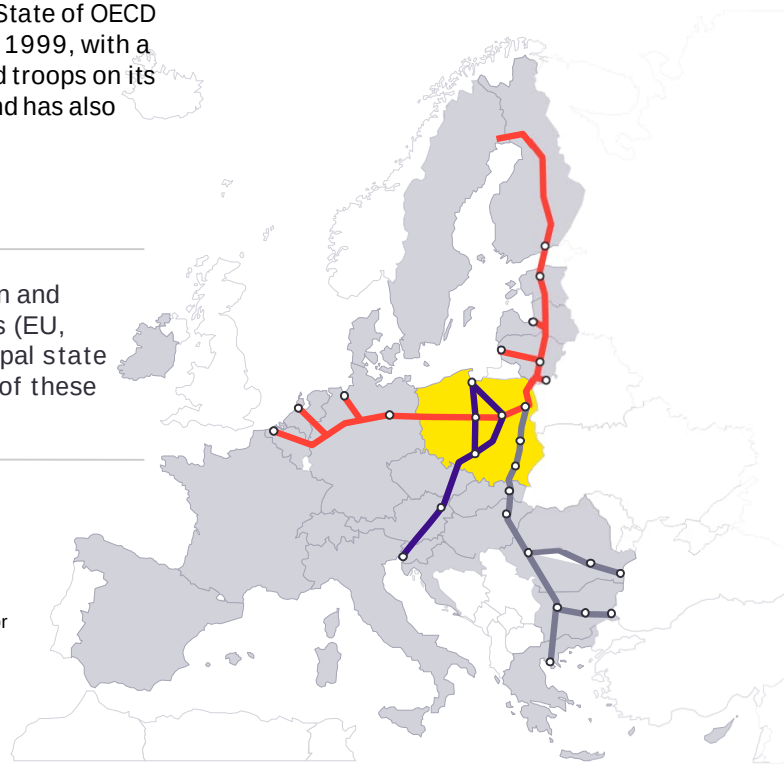
However, Poland's urbanisation rate is significantly lower than that of the EU and OECD countries and amounts to only 60%, with a downward trend due to dynamic suburbanisation.

Urbanised areas cover more and more land, hence the decreasing area of agricultural land, which currently amounts to 47% of the country's area, while still being higher than in the EU and OECD. About 30% of the country's land is covered by forests.

Poland has been a Member State of OECD since 1996 and NATO since 1999, with a significant presence of allied troops on its territory. Since 2004. Poland has also been a Member State of EU.

Poland joined key European and international organizations (EU, NATO, OECD) and is principal state at the eastern crossroads of these cooperation areas.

Poland on the routes of Trans-European Transport Networks (TEN-T) and Via Carpatia route



*Trans-European Transport Network is a planned network of roads, railways, airports and water infrastructure in the European Union

General information about Poland | Geography

Poland's location makes it an important transport hub, in particular in Eastern Europe. The TEN-T network routes running from Sweden and Finland to the south and from west to north intersect in Poland.

Poland is also the gateway to Europe for rail connections from Asia. Having the westernmost broad gauge railway line (Russian gauge) makes it easier to transport cargo overland.

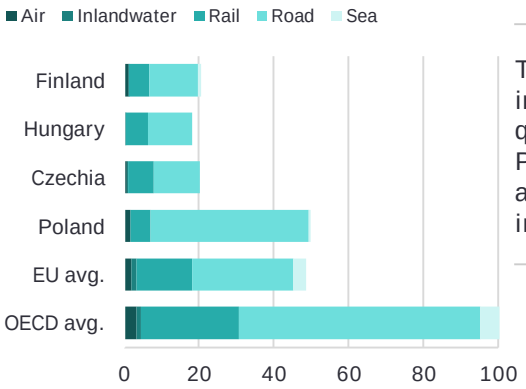
Seaports are also strategic points on the infrastructure map of Poland, the largest of which, Gdańsk and Gdynia, are also one of the largest seaports in the Baltic Sea region. Deepwater terminals in Gdansk handle oceanic connections from Asia, hence it is a transhipment hub for this part of Europe.

Poland is also crossed by the main connection transporting fossil fuels from east to west Europe (Yamal gas pipeline and Przyjazn oil pipeline).

Poland has passenger air connections with major European cities. There are regular train connections to Berlin, Budapest and Vienna, as well as to Kiev and Moscow.

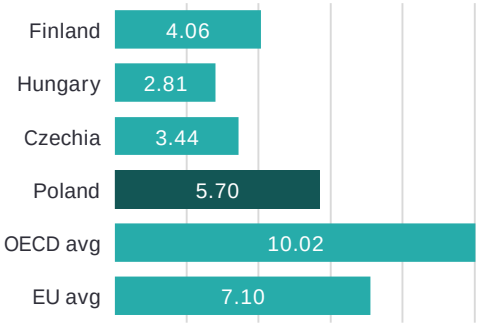
Air connections from Poland are carried out mainly from the largest airport, Warsaw Chopin. There are also long-haul flights to Asian destinations from there, including daily flights* to Japan. Since 2016, LOT Polish Airlines has been strengthening air connections in this direction. The last 5 years have seen a 76% increase in Poland's international air connectivity.

Infrastructure investment 2009-2019, %



Source: Eurostat, OECD

International air connectivity by IATA, [million]



Source: IATA, Air connectivity – measuring the connections that drive the economic growth, 2019

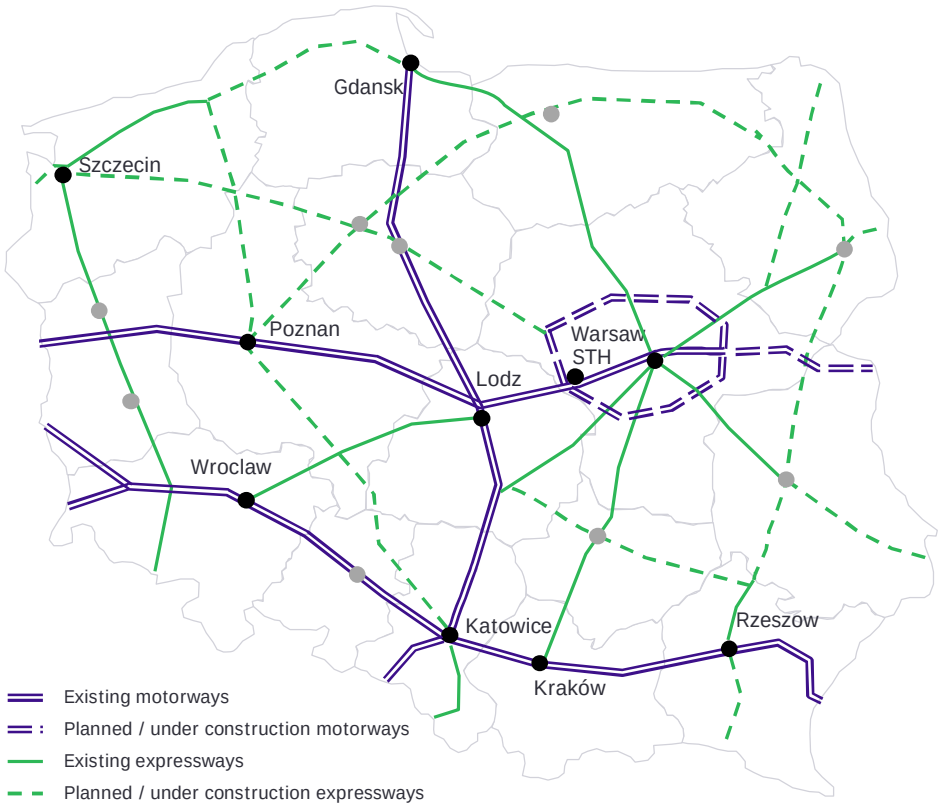
Thanks to numerous infrastructure investments in the last decade, the quality of transport infrastructure in Poland, especially the road, maritime and air network, has significantly improved.

Poland – Japan air flight connetction

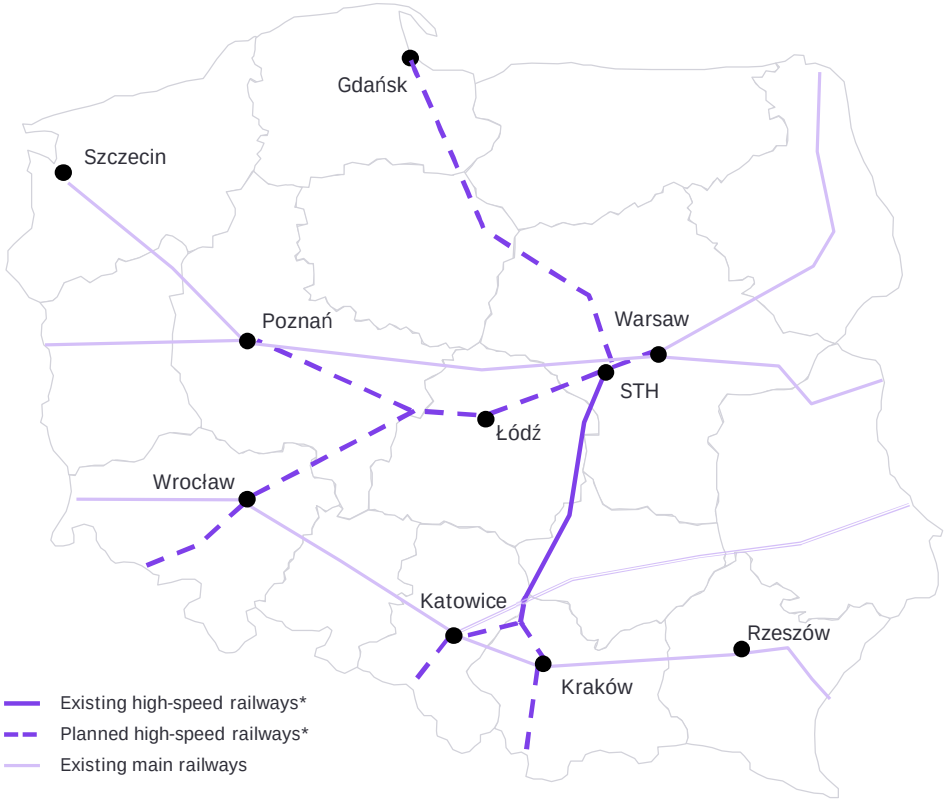
**Data 2019, before Covid-19 crisis in aviation*

General information about Poland | Geography

Map of road infrastructure in Poland



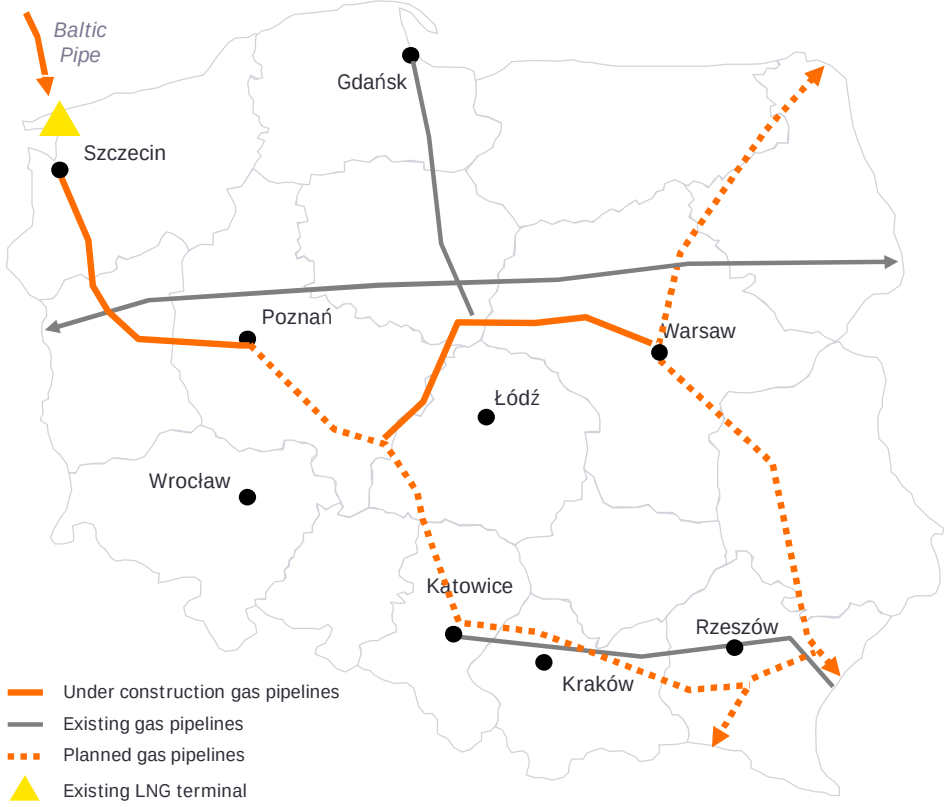
Map of rail infrastructure in Poland



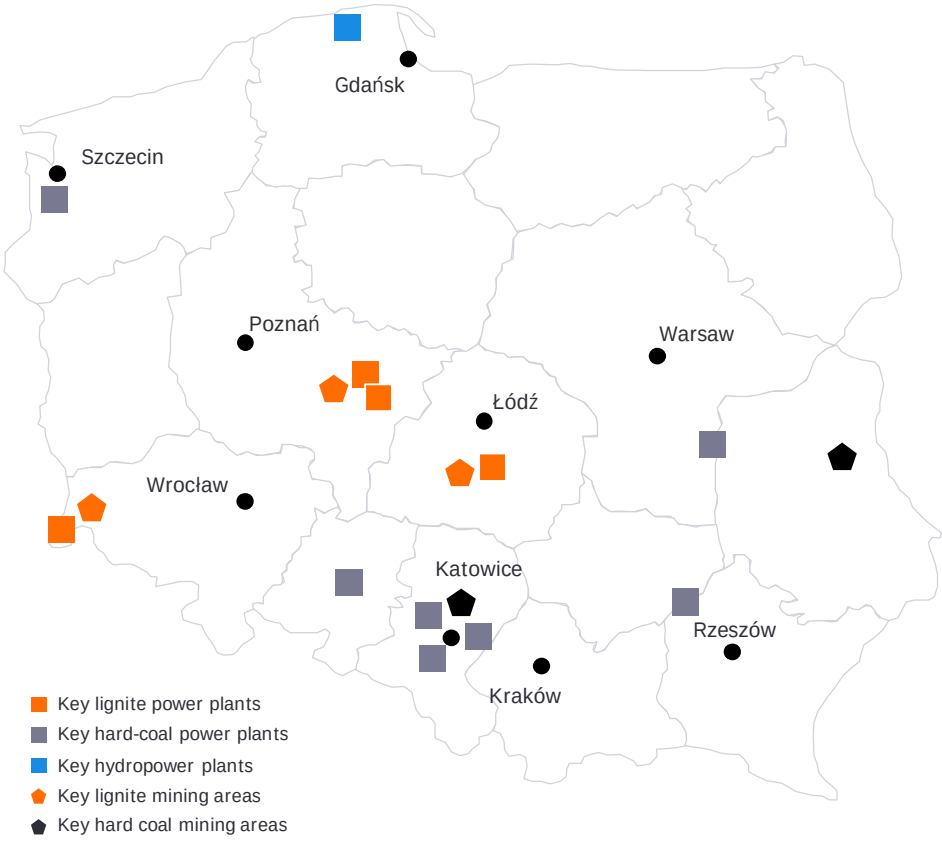
*Maximum speed 200-250 km/h

General information about Poland | Geography

Map of gas infrastructure in Poland



Map of energy infrastructure in Poland



General information about Poland | Demography

Poland is a country with a current population of 38 million, but demographic forecasts are not optimistic. The population is expected to fall to around 34 million inhabitants by 2050.

Currently, around 19% of the population is over 65 years of age. The number of residents aged 15-65 is decreasing and currently stands at around 66%. This is only slightly higher than the EU and OECD average, but by 2050 this proportion will have fallen steadily as the number of people over 65 increases.

Ageing of the society is one of the main social challenges for Poland, as the expected fertility rates do not allow for generation replacement, leading to a successive decrease in the number of population in the pre-working age.

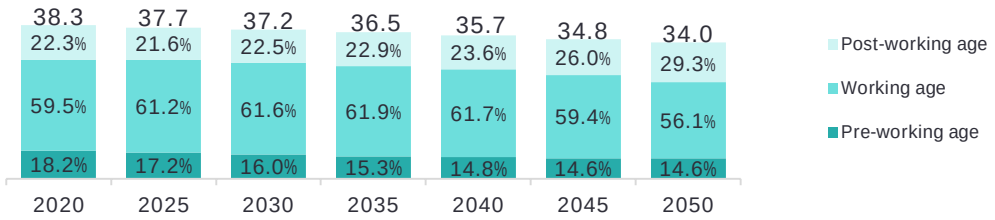
One of the main competitive advantages of Poland is the high share of population with higher education. In addition, Polish society is quite religious, while appreciating values such as tolerance and human rights.

Nearly one third of Poland's population has higher education. In comparison to the countries of the Eastern European countries, this share is above average, and only slightly higher than the EU average.

Poles are a relatively tolerant society. In social surveys, about 17% of respondents indicate this value as important to their personal feelings. Above-average Poles value human rights (38% frequency of responses), and are clearly more religious than comparable EU countries.

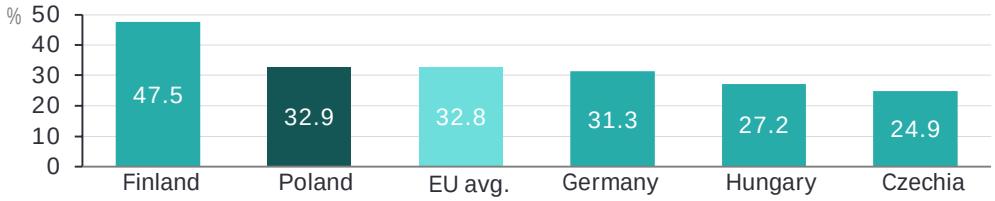
Internal migrations change the settlement pattern within the country. The increasing attractiveness of living in suburban areas results in suburbanisation-related migrations, hence the successive decrease of the urbanisation rate. According to forecasts, in 2050 approx. 45% of the population will live in rural (including suburban) areas, where currently approx. 40% of the Polish population resides.

Population forecast in Poland by 2050, millions inhabitans

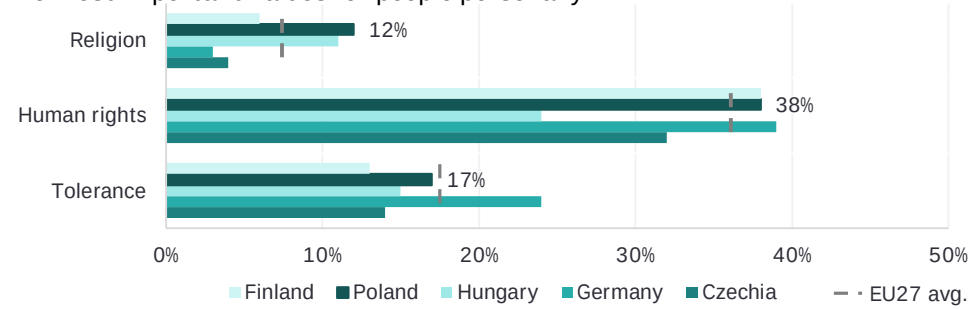


Source: Central Statistical Office

Population with tertiary education, 2020 (%)



The most important values for people personally*



**The survey allowed a maximum of 3 responses, out of the 13 options available. Selected results of the response options are presented.* *Source: EC, Standard Eurobarometer 95 – Spring 2021*

General information about Poland | Demography

The demographic changes will be influenced by migrations. Poland's accession to the EU was followed by rapid waves of economic emigration to the Western European countries, which ceased with the improvement of the economic development in the country.

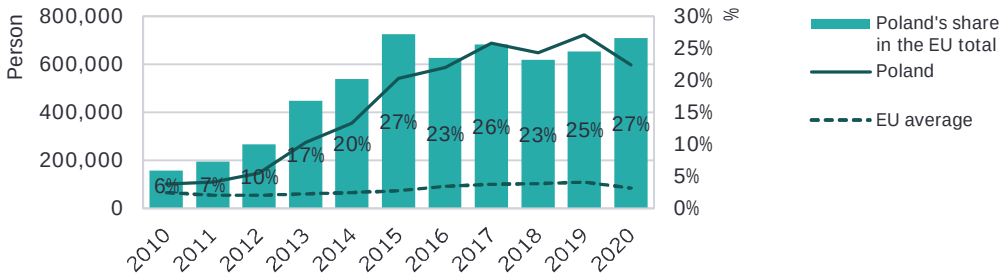
In recent years the directions of migration have changed significantly. Poland has increased the number of residence permits issued to migrants during the last 10 years, at its peak issuing 700,000 such new permits (2019). Since 2015, annually more than 25% of all permits in the EU are issued in Poland. At the same time, the average for EU countries does not exceed 100,000 permits.

Key demographic challenges

Poland’s working age (20-64) population is expected to decline by 7.3% between 2020 and 2030. While the large influx of immigrants following the outbreak of war in Ukraine in 2014 has helped mitigate the pressures in the labour market, the unemployment rate is nevertheless very low and wages are growing at a high pace (10% YoY). Going forward, these pressures are likely to intensify, even though further increase in labour force participation among pre- and post-retirement age persons, a move away from agriculture and continuation of immigration from Eastern Europe will partially offset the effects of the fall in working age population.

In this environment, businesses need to be ready to accommodate further high wage growth, which will hurt particularly those sectors that based their competitiveness on low labour costs. When increasing employment becomes much more difficult, businesses will need to focus more on raising productivity and investing in physical capital, including technologies enabling automation. From macroeconomic perspective, GDP growth is likely to slow down as employment growth stagnates or turns negative, even if productivity growth accelerates. Finally, population ageing is putting increased pressure on the pension system, which is likely to result in increased taxation in various forms, not only of labour, but also of e.g. international corporations.

First residence permits in Poland in EU for family, education and remunerated activities reasons 2010-2020



Source: Eurostat
Note: data refer to residence permits and not to permanent migration.

Poland is currently undergoing a shift from emigration to immigration country. This, coupled with ageing population will influence the future policy of the government.

General information about Poland | Key metropolitan areas

Szczecin

Population of metropolitan area	0.69 milion
Population of urban area	0.4 million
Modern warehouse space (sq m)	772,483
Modern office space (sq m)	183,400
Students at universities	32,900

Gdansk

Population of metropolitan area	1.27 million
Population of urban area	0.47 million
Modern warehouse space (sq m)	813,294
Modern office space (sq m)	924,000
Students at universities	78,400

Warsaw

Population of metropolitan area	2.85 million
Population of urban area	1.79 million
Modern warehouse space (sq m)	4,891,266
Modern office space (sq m)	6,100,000
Students at universities	235,500

Poznan

Population of metropolitan area	1.04 million
Population of urban area	0.53 million
Modern warehouse space (sq m)	2,238,804
Modern office space (sq m)	618,700
Students at universities	119,000

Lodz

Population of metropolitan area	1.09 million
Population of urban area	0.67 million
Modern warehouse space (sq m)	3,192,648
Modern office space (sq m)	579,400
Students at universities	82,900

Wroclaw

Population of metropolitan area	0.89 million
Population of urban area	0.64 million
Modern warehouse space (sq m)	2,324,954
Modern office space (sq m)	1,242,600
Students at universities	115,600

Rzeszow

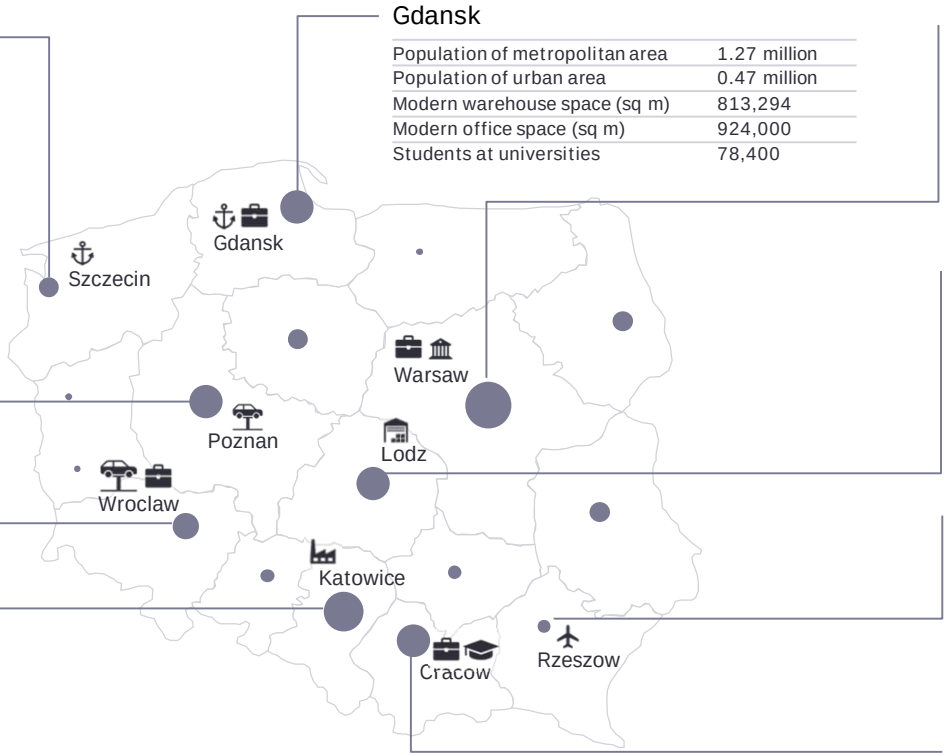
Population of metropolitan area	0.37 milion
Population of urban area	0.2 million
Modern warehouse space (sq m)	176,300
Modern office space (sq m)	108,000
Students at universities	40,000

Katowice

Population of metropolitan area	2.49 million
Population of urban area	0.29 million
Modern warehouse space (sq m)	3,700,361
Modern office space (sq m)	591,000
Students at universities	77,300

Cracow

Population of metropolitan area	1.19 million
Population of urban area	0.78 million
Modern warehouse space (sq m)	559,944
Modern office space (sq m)	1,599,200
Students at universities	143,700



2.85 million
Population of metropolitan area

General information about Poland | Key metropolitan areas

The largest Polish city is its capital, Warsaw. Six Polish metropolitan areas exceed 1 million inhabitants.

The capital city of Warsaw

Warsaw is the capital of Poland and its largest city, with a metropolitan area of over 2.6 million inhabitants. Warsaw is a dynamic business and administrative centre, the headquarters of the Warsaw Stock Exchange and most state institutions. Warsaw is ranked among the global growth centres: in the Global Cities Index it is classified 64th and among the most connected cities according to GaWC 2020 it is in the Alpha category.

Katowice (Upper Silesian-Zagłębie Metropolis)

Katowice is the capital of the Upper Silesian-Zagłębie Metropolis, a conurbation comprising of dozens of cities and towns which has been undergoing a transformation over the last few decades from an economy based on mining and heavy industry to a modern service sector and industry (automotive, RES). Silesia and the Zagłębie region are well-located on the transport routes. In the ranking among the most connected cities according to GaWC 2020 it is included in the Gamma - category.

Cracow

Cracow is the former capital of Poland and currently the second largest Polish city. Kraków is a strong academic centre and a global centre for the BPO/SSC sector. Due to its history and numerous Polish cultural monuments, Krakow is one of the most famous Polish cities, visited in large numbers by tourists from all over the world.

Gdańsk

Gdańsk is the main centre of the Polish coast and the main port of the Baltic Sea. Together with Gdynia and Sopot it forms a metropolitan area Tricity with a population of over 1 million. Traditionally, Gdańsk and Gdynia were centres of the shipbuilding industry, which transformed to specialized ship and offshore construction. Gdańsk is the main maritime hub for ocean shipping on the Baltic Sea basin. In Tricity, however, the BPO/SSC sector is developing dynamically.

Frederic Chopin

Fryderyk Chopin was an outstanding Polish composer and pianist. He is considered to be one of the best pianists of the Romantic era. The Chopin Competitions held in Warsaw attract the interest of the best musicians from all over the world.

Maria Curie-Skłodowska

One of the most prominent Polish scientists, Nobel Prize winner, discoverer of radium and polonium.

Adam Małysz

The best-known and titled Polish ski jumper. Multiple world cup crystal ball winner and Olympic silver medals winner. Born and strongly connected with the city of Wisła, located in the Silesian Voivodeship.

John Paul II

One of the most famous Poles in the world, the Pope of the Roman Catholic Church. He was strongly associated with Krakow in his priestly ministry and in his private life.

Lech Wałęsa

Legendary leader of Solidarity established in Gdansk, the first free labour union in the former Soviet bloc countries. Awarded the Nobel Peace Prize.

General information about Poland | Key metropolitan areas

Wrocław

Wroclaw is the capital of the Polish automotive industry located in Lower Silesia, which is also a vibrant urban centre with a developed electro-mechanical industry and a dynamically growing BPO/SSC sector. Many foreign investments of Japanese companies are located in and around Wroclaw. The region's strength also comes from the mining and processing of mineral resources, including copper and zinc.

Łódź

Łódź is a city located at the intersection of two major Polish motorways. Once famous for its textile industry which used to conquer Asian markets, today Łódź is one of the most important places on the logistic map of the country. Since the 1990s however, Łódź has been struggling with serious structural and economic problems, including a dynamically decreasing number of inhabitants.

Poznan

The capital of the Wielkopolska region is Poznań, which is a strong academic centre and an important location for the automotive sector in Poland, including e.g. Solaris, Volkswagen.

Szczecin

Szczecin is the second most important maritime industry centre in Poland, which together with Świnoujscie constitutes a port unit mainly handling bulk and ro-ro cargo. Szczecin is also an important centre for the chemical industry (nitrogen plants). Szczecin's development is also influenced by its proximity to Berlin, from which it is only 150 km by direct motorway and railway.

Rzeszów

Rzeszów is a relatively small city, but with a rapidly growing population due to its location in the heavily populated Podkarpackie region. One of the most important centres of eastern Poland, it is located close to the border with Ukraine. The Aviation Valley, which is a concentration of companies from the aviation industry, has its beginnings in Rzeszów.

Olga Tokarczuk

Polish writer, essayist, poet and screenwriter residing in Wroclaw. By receiving the Nobel Prize in 2018, she joined a pleiad of Polish literary representatives such as Adam Mickiewicz, Henryk Sienkiewicz and Wisława Szymborska.

Robert Lewandowski

The most famous Polish footballer who plays as a striker in Bayern Munich. Multiple winner of the title of the Bundesliga champion, the Champions League, the league's top scorer and the winner of FIFA The Best in 2020 and 2021. He comes from Warsaw but started his international career in the Poznań team Lech, where he won the Polish championship.

Krzysztof Penderecki

Born near Rzeszów, an outstanding Polish contemporary composer. Winner of numerous awards, including a Grammy music award.

General information about Poland | Economy

Poland is the largest EU member state in „Eastern" Europe, well integrated into global supply chains and political networks.

The most relevant economic regions in Poland are the Mazowieckie (Warsaw), Ślaskie (Katowice) and Wielkopolskie (Poznań) voivodeships. These are also the regions with the largest population, although in general most of the population live in the south of the country.

Currency

PLN, floating (no short-term prospects for euro adoption)

Total GDP (USD), 2021

655.3b

Population, 2021

37.8m

GDP per capita PPP (international USD), 2021

37 323 (77% of EU-27)

Sovereign rating

A/A- (Moody's/S&P & Fitch)

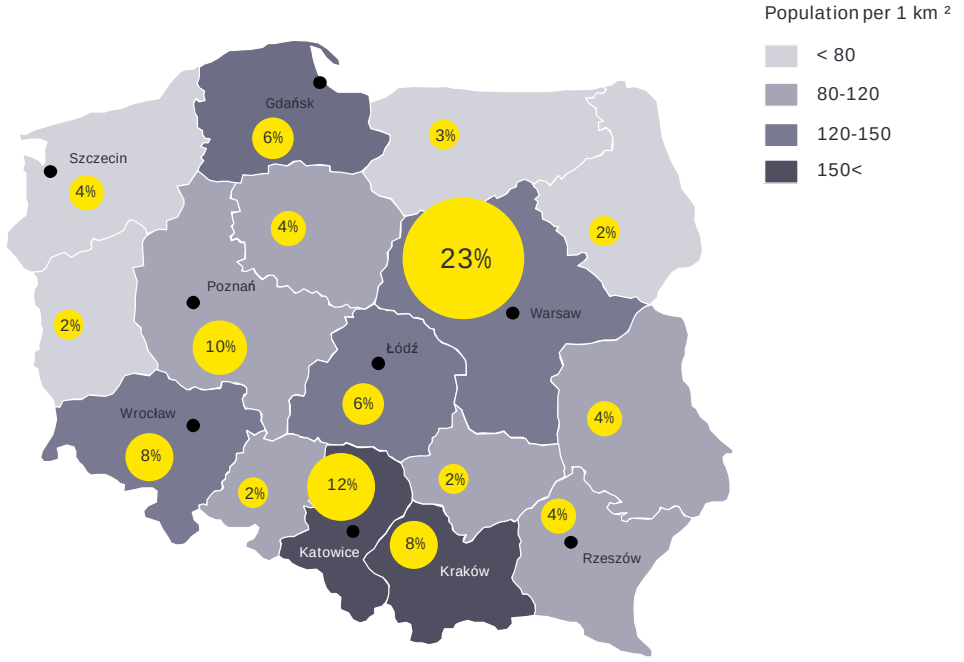
Exports to GDP, 2020

56.2%

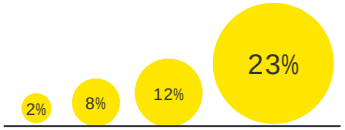
Monetary policy

2.5% inflation target

Gross Domestic Product by regions (current prices) in 2019 and population density in 2020



Gross Domestic Product % in total



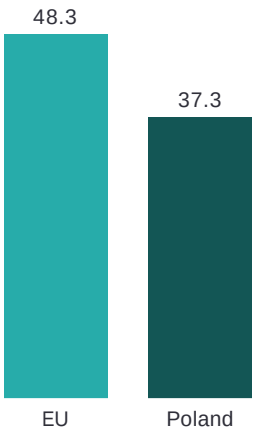
Source: IMF, World Economic Outlook, October 2021 (GDP and population), Eurostat (exports).

General information about Poland | Economy

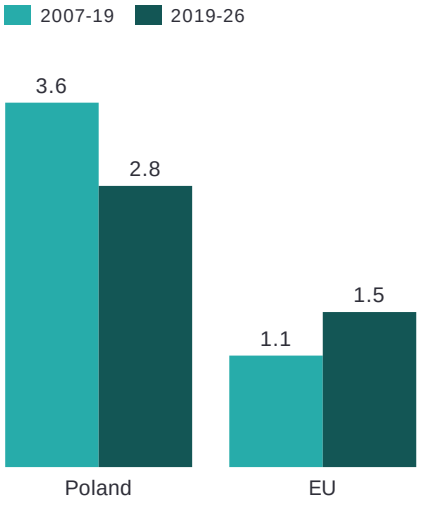
The Polish income level is still lower than in advanced economies, but has been and is expected to continue catching up at a relatively fast pace, with very limited – if any - long-term losses from the pandemic.

Poland's economy is well diversified, with comparative advantages in i.a. food and furniture production and land transport. At the same time, the importance of pandemic-struck sectors is relatively low.

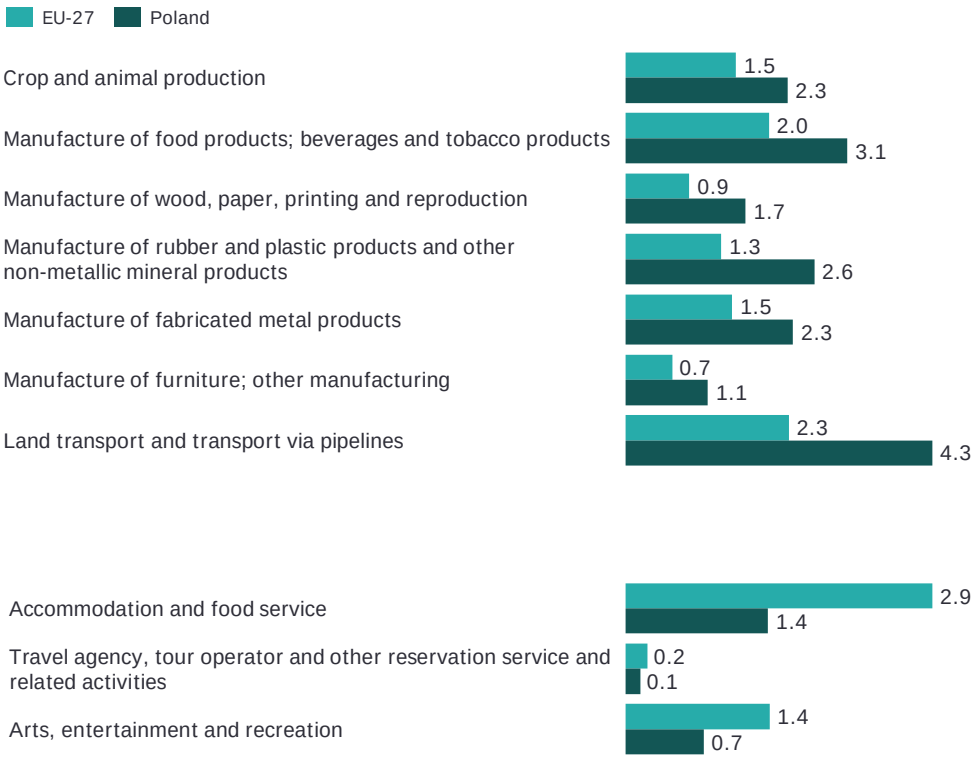
GDP per capita, PPP, 2021, Thousands of international USD



GDP growth, CAGR (%)



Gross value added in selected industries, % of total

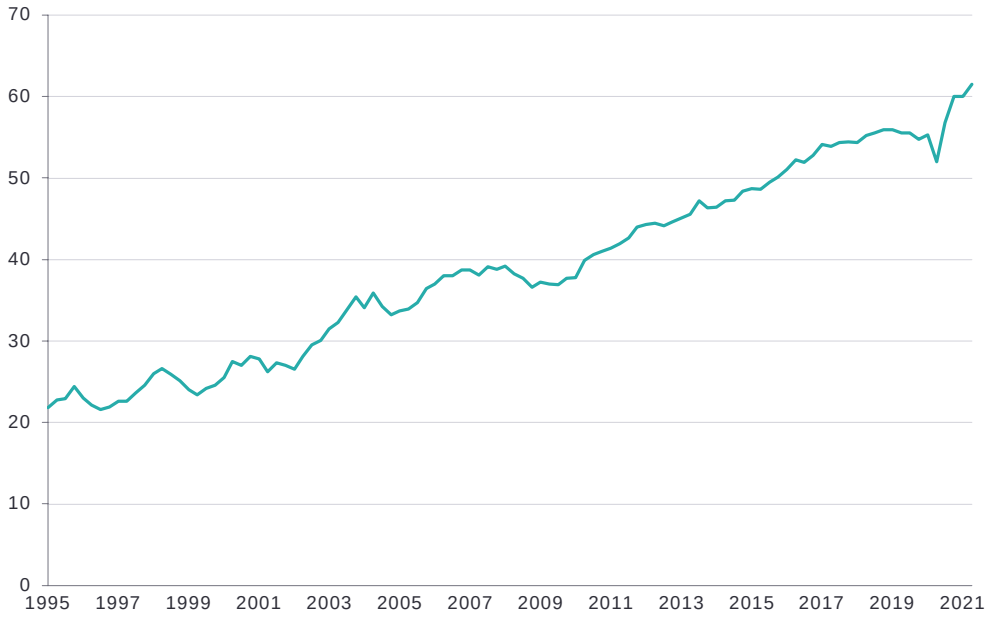


Source: IMF, World Economic Outlook, October 2021.

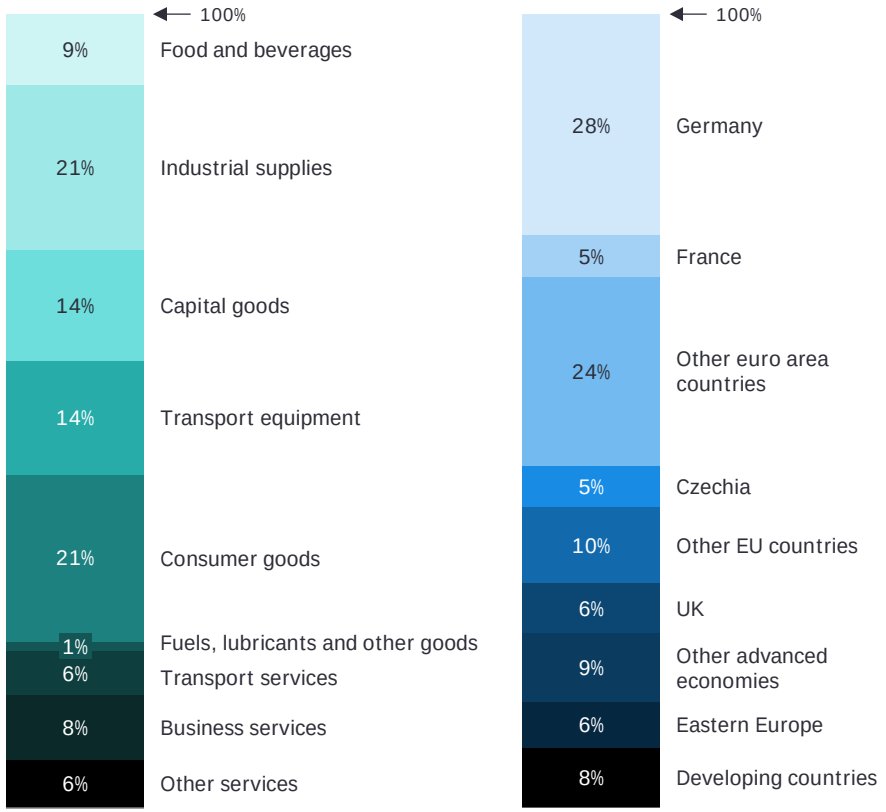
General information about Poland | Economy

Continuous expansion into foreign markets, especially in Europe, has been a key source of growth in the Polish economy.

Exports to GDP in Poland (%)



Product and country structure of Polish exports in 2020

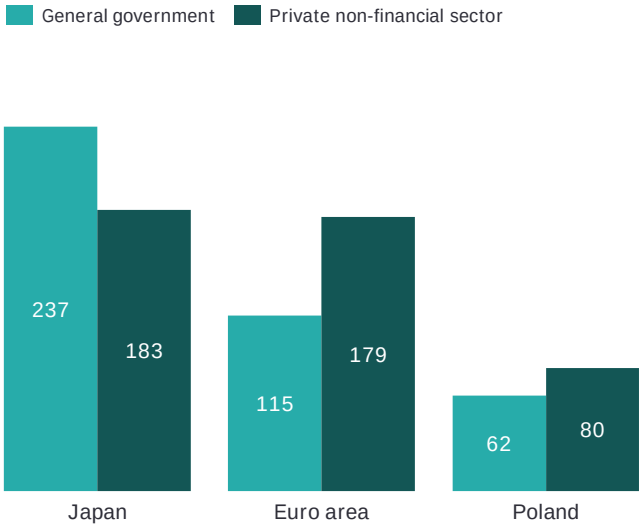


Source: Eurostat, NBP, Statistics Poland (GUS).

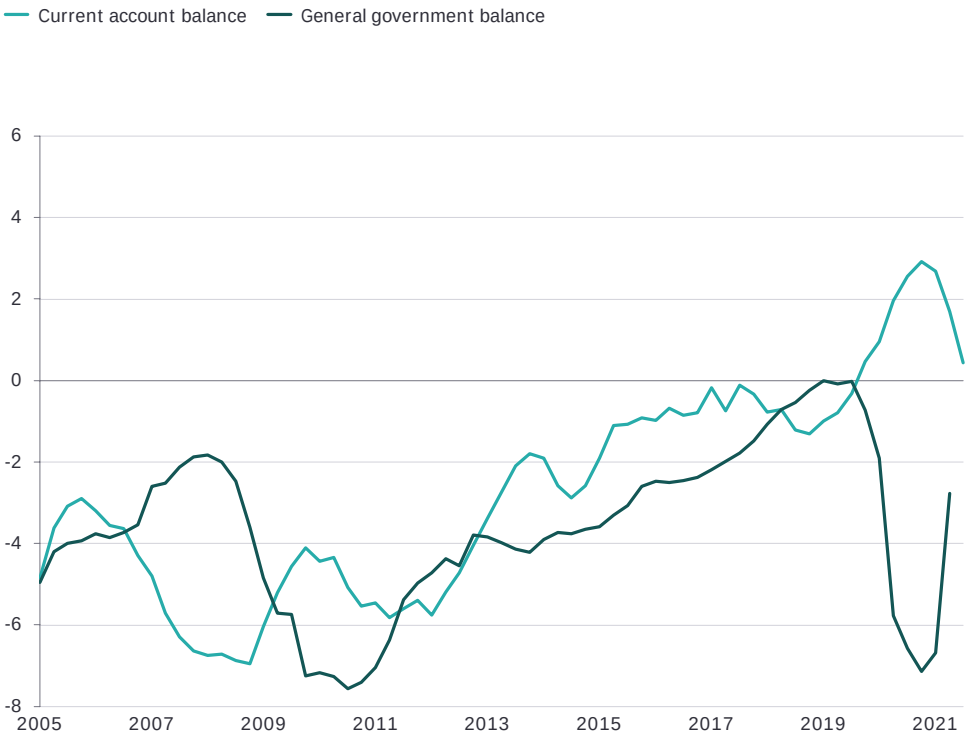
General information about Poland | Economy

Poland has a relatively low level of indebtedness and a balanced current account, with the fiscal deficit dropping significantly in 2021. This points to a lack of serious imbalances in the fiscal and financial sectors.

Public and private debt levels in 2021Q1 (% of GDP)



Current account and general government balance in Poland (4Q rolling sum, % of GDP)

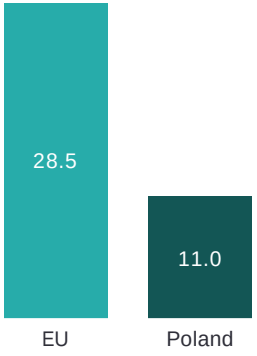


Source: BIS (left chart), NBP and Eurostat data, own calculations (right chart).

General information about Poland | Economy

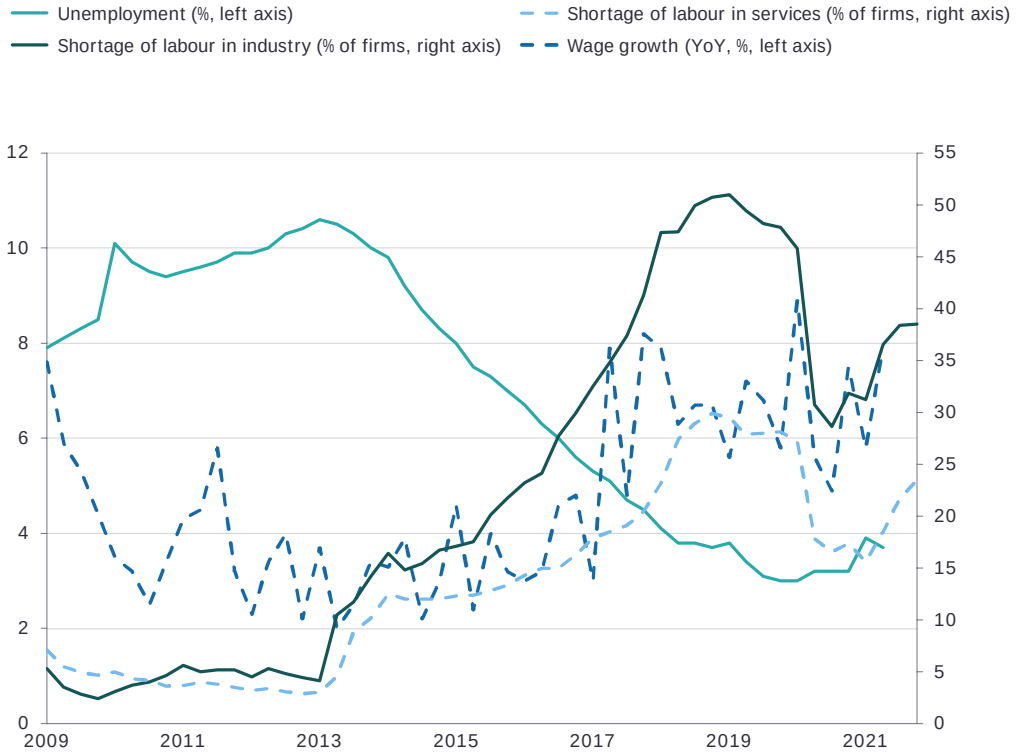
Labour remains cheap relative to productivity and education, but it may start changing as the hunt for the dwindling labour force puts upward pressure on wages. Large immigration (of about 1.5m workers, not visible in official population statistics), mainly from Ukraine, has helped fill the gaps in the labour market in recent years, but future migration flows are uncertain.

Labour cost, 2020 (euros per hour)



Population with tertiary education, 2020 (%)

Labour market conditions in Poland



Source: Eurostat.

General information about Poland | Polish Investment Zone

Polish Investment Zone – exemption from corporate income tax

Quantitative criteria

Investment costs (investments expenses or two-year employment costs) depend on:

- Unemployment rate in the district (PL: powiat) relevant for the new investment location (in comparison to the average unemployment rate in Poland) and
- The size of the enterprise.

	Eligible costs (m PLN)**	
Unemployment rate in the particular district*	Large (industrial project)	Modern services and R&D project
⩽ 60%	⩾ 100	⩾ 5
(60%;100%>	⩾ 80	⩾ 4
(100%;130%>	⩾ 60	⩾ 3
(130%;160%>	⩾ 40	⩾ 2
(160%;200%>	⩾ 20	⩾ 1
(200%;250%>	⩾ 15	⩾ 0.75
> 250%***	⩾ 10	⩾ 0.5

Maximum level of support (large enterprises)	Up to 50%: of the value of capital expenditures or two-year employment costs depending on the investment location
Location	Any location in Poland
Duration of the tax exemption	From 10 up to 15 year of CIT exemption depending on investment location
Evaluation criteria for granting CIT exemption	Quantitative and qualitative criteria (e.g. R&D activities, creating highly-paid jobs) have to be met
Application procedure	In order to obtain a decision on receiving the right to benefit from the CIT exemption, an investor is required to file an application to relevant SEZ authority prior to starting works on the investment. After the evaluation of such an application, the SEZ authority makes a decision about the grant

**When compared to the average unemployment rate in Poland.*
***In case of investments concerning modern services for business and micro, small and medium enterprises, the conditions regarding eligible costs are decreased by: 98% (micro), 95% (small), 80% (medium), 95% (modern services for business)*
**** >250% and medium-sized cities losing socio-economic functions and municipalities bordering these cities.*

General information about Poland | Polish Investment Zone

Qualitative evaluation criteria (Modern services investments)

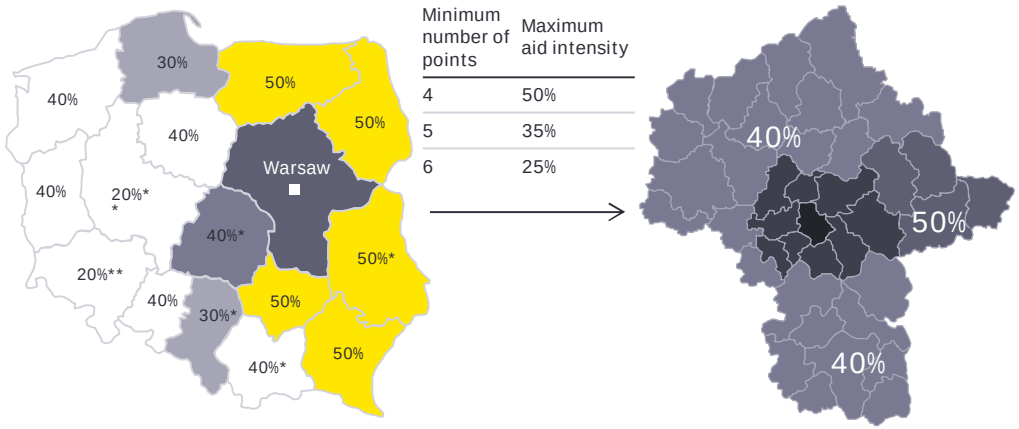
Sustainable economic development (5 points)

- Consistency of the investment with the current national development policy or regional smart specializations
- The level of exports higher than national average
- Conducting R&D activities within investment
- Participation in one of the Key National Clusters
- Promoted investments implemented by SMEs

Sustainable social development (5 points)

- Low level of investments impact on environment, application of environmental friendly solutions
- Location of investments in medium-sized cities losing socio-economic functions or communes bordering those cities, or districts with an unemployment rate> 160% of the average
- Creation of specialized jobs and offering stable employment
- Supporting employees in acquiring education and professional qualifications and cooperation with industry schools
- Providing employees with an additional package of benefits (healthcare, leisure etc.)

New aid intensity map effective from January 1, 2022



Legend:

* Possibility of increasing the aid by 10% in selected locations supported by the Just Transition Fund (base intensities marked blue on the map)

** Aid available to large enterprises only for investments concerning setting-up new establishment or (in the case of investments in existing facilities – for projects concerning activities classified under different 4-digit NACE statistical code than the activity already carried out in the establishment (with some exceptions for locations supported by the Just Transition Fund).

- Entrepreneurs investing in the following communes will be able to count on the support of 25%:
- Baranów, Błonie, Góra Kalwaria, Grodzisk Mazowiecki, Jaktorów, Kampinos, Leoncin, Leszno, Nasielsk, Prażmów, Tarczyn, Zakroczym and Żabia Wola.
- In turn, 35% support will cover the communes of:
- Dąbrówka, Dobre, Jadów, Kałuszyn, Kołbiel, Latowicz, Mrozy, Osieck, Serock, Siennica, Sobienie-Jeziory, Strachówka and Tłuszcz.
- In the remaining locations of Mazovia - no possibility of obtaining regional aid

General information about Poland | Polish Investment Zone

Qualitative evaluation criteria (manufacturing investments)

Sustainable economic development (5 points)

- Consistency of the investment with the current national development policy or regional smart specializations
- The level of exports higher than national average
- Conducting R&D activities within investment
- Establishing a business service centre with an international reach
- Promoted investments implemented by SMEs

Sustainable social development (5 points)

- Creation of highly-paid jobs and offering stable employment
- Low level of the investment's environmental impact, application of environmental friendly solutions
- Location of investments in medium-sized cities losing socio-economic functions or communes bordering those cities, or districts with an unemployment rate> 160% of the average
- Supporting employees in acquiring education and professional qualifications and cooperation with industry schools
- Providing employees with an additional package of benefits (healthcare, leisure etc.)

Changes in the regulations of the Polish Investment Zone and from the "Polish Deal"

- Application of the relief limited to income from the investment
- Change of support may not reduce the level of employment by more than 20%

Reduction of the input criterion for large and medium-sized companies by 50% in the case of reinvestment	Increasing the reduction of the minimum threshold of investment expenditure for medium-sized companies from 80% to 90%	Exclusion of the 95% reduction of the entry threshold for investments concerning R&D activities	Change of the definition of a new investment for investors from the Mazowieckie Voivodeship (new activity in a plant vs. a voivodeship)

Elimination of the 30% buffer for the value of eligible costs	Updating the list of medium-sized cities losing socio-economic functions	Minor changes to the quality criteria

General information about Poland | R&D reliefs

R&D tax relief: additional deduction of R&D costs from tax base

Catalogue of eligible costs

- Remuneration and social security contributions of employees for work time allocated to R&D activity is included in the total work time
- Materials and raw materials directly connected with the R&D activity
- Expert analyses, opinions, advisory and equivalent services, as well as the purchase of scientific research results, rendered or carried out under a contract by a scientific unit for the purposes of the R&D activities
- Paid use of scientific and research apparatus used exclusively in the R&D activity being carried out
- Depreciation and amortization write-offs on fixed assets and intangible assets used in the course of the R&D activities

Add. deduction level: 100%*

200% for R&D Centres (till the end of 2021 – 150%)

* Starting from 2022: 200% with regard to employment costs according to the CIT Act amendment awaiting President's signature

Real benefit of the entrepreneur:

19%

Research and Development Centre: official status granted by the Minister of Economic Development and Technology

- The status of a Research and Development Center may be obtained by an entity which:
  1. has a legal personality
  2. is not a research institute
  3. conducts systematic research and development activities
  4. whose net revenues from the sale of R&D services amounts to at least:
- 20% of the total annual net revenues – in the case of entities with revenues of at least PLN 5m
- 70% of the total annual net revenues – in the case of entities with revenues of at least PLN 2,5m and lower than PLN 5m.
- Benefits of possesing a RDC Status:
  1. R&D relief - the right to a 200% (till the end of 2021 – 150%) additional deduction of R&D costs from the tax base
  2. Real estate tax exemption
  3. Exemption from agricultural and forestry tax

Sales revenues	at least	20%	PLN 2.5 m – PLN 5 m	70% -
	PLN 5 m	- R&D services		R&D services

General information about Poland | Polish Deal

Upcoming changes in R&D incentives - part of „Polish Deal" regulatory package – comes into force January 2022

Changes in R&D tax incentives to be implemented from 2022.

In accordance with draft CIT Act amendments currently processed through parliament.

Innovative transformation of the economy

Combining tax preferences

Possibility of simultaneous use of R&D relief and IP Box

Higher R&D tax relief and relief for innovative employees

Possibility to deduct 200% of employee costs by enterprises that do not have the R&D Centre status

Possibility to deduct 200% of eligible costs by R&D Centres

Decreasing the value of income tax advances and the value of flat-rate income tax deducted from revenues from employment or civil law contracts – in cases where taxable income is not sufficient to take full advantage of the R&D tax credit; applicable to employees involved in at least 50% of their working time in R&D activities

New tax relief for prototyping

Possibility to deduct an additional 30% of eligible costs of prototyping from the tax base

Eligible costs include i.a. costs of raw materials, components of prototype product, investments in assets required to make the prototype, costs of external certification, advisory

Trial production of a new product and its introduction to the market.

New tax relief for robotization

Possibility to deduct an additional 50% of investment costs in robots, related peripherals, intangible assets, employee training for robots from the tax base

New tax relief for business expansion

Possibility of additional deduction of costs incurred by the entrepreneur in order to expand its sales markets.

Eligible costs include tax deductible costs incurred in order to increase revenues from the sale of products.

Polish Deal in infrastructure investments

Strategic Investments Programme

The Strategic Investments Programme is a non-refundable subsidy for small but important public investments carried out by municipalities, districts, cities and voivodships throughout Poland. It is a Programme which is built around the main principles of the Polish Deal. The Programme covers 35 areas of the economy. In the first intake, the priorities will include investments in water and sewage infrastructure, modernisation of heat sources to zero-emission or waste management, as well as social investments such as crèches, kindergartens or bicycle paths.

Government support for local governments in the implementation of strategic investments

The government, with the help of the Polish Development Bank (BGK), will help rebuild the economy after the pandemic. The Polish Order has a long-term perspective. The implementation of the planned strategic investments will raise the productivity level of the entire Polish economy.

The objective of the Strategic Investments Programme

- Stimulation of investment activity of local self-governing units
- Development of local entrepreneurship
- Improvement of living conditions of citizens
- Creation of new jobs
- Support for sustainable development
- Effective involvement of the financial sector

General information about Poland | Basic socio-economic indicators

Basic socio-economic indicators	Poland	Avg. EU	Avg. OECD
Population density per 1 per km^2	123	117	39
Urban population	60	75	81
Population in urban agglomerations of more than 1 million (% of total population)	5	18	38
Population ages 65 and above (% of total population)	19	21	17
Population ages 15-64 (% of total population)	66	64	65
Population ages 0-14 (% of total population)	15	15	18
Employment in services (% of total employment)	59%	71%	73%
Employment in industry (% of total employment)	32%	25%	23%
Employment in agriculture (% of total employment)	9%	4%	5%
Agricultural land (% of land area)	47.4%	40.9%	34.3%
Forest land (% of land area)	30.5%	39.8	32.8
Motorways and expressways per 1,000 km^2	6	21	12.7
Railways km per 100 km^2	5,92	4,37	1,20
Electricity production from renewable sources	12.7%	18.0%	10.2%
CO2 emissions (metric tons per capita)	8.2	6.4	8.8
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	100	79.9	60.8
Alternative and nuclear energy (% of total energy use)	1.1	19.8	13.4
Secure Internet servers (per 1 million people)	25,147	50,254	57,528
Fixed broadband subscriptions (per 100 people)	21.70	36.56	33.09

Source: Eurostat, Central Statistical Office, Worldbank and OECD databases

3

Review of infrastructure programs

Review of infrastructure programs | Introduction

Introduction to the chapter

This chapter contains basic information on Polish investment programmes in the transport infrastructure, energy and IT & telecommunications sectors. The programmes are described with respect to their investment volumes, main stakeholders and potential beneficiaries. The description also includes directional guidelines for the mechanisms of programme implementation.

Programmes

This chapter contains the description for the following programmes

- National Recovery Plan
- European Funds for Infrastructure, Climate, Environment – FEnIKS
- National Roads Construction Programmes
- Energy policy of Poland until 2040
- Polish Hydrogen Strategy until 2030
- Polish nuclear power programme
- Solidarity Transport Hub

Review of infrastructure programs | National Recovery Plan (NRP)

General overview

The Polish National Recovery Plan (NRP) is a national program financed by EU funds, with an execution period until 2026. The Plan will implement a set of reforms to promote economic, social and territorial cohesion by strengthening resilience and crisis preparedness.

NRP will be financed by total resources of €58.1 billion, distributed by around €23.9 billion in grants and €34.2 billion in loans, and with a disbursement profile that will allow the necessary liquidity for the NRP to function as an effective instrument in response to the crisis.

The National Recovery Plan is structured around five economic pillars:

- Resilience and competitiveness of the economy
- Green Energy and reduction in energy intensity
- Digital transformation
- Effectiveness, accessibility and quality of the healthcare system
- Green and intelligent mobility

NRP aims to enable:

- Qualitative, innovative development of the economy leading to increased productivity with a view to the digital transformation of the country and society;
- Green transformation of the economy and development of green, smart mobility;
- Increase in social capital and quality of life, in particular by ensuring improved health of citizens and higher quality of education and skills adapted to the needs of a modern economy.

Please note that as at the date of preparing this slide deck, the National Recovery Plan is still subject to discussions between the Polish government and the European Commission (EC), while its implementation depends on the ECs approval. The information presented on the following slides, pertaining to support areas we initially identified as promising, is limited.

Main objectives

According to the assumptions of the NRP instrument, the strategic objective of the NRP is to rebuild the development potential of the economy, lost as a result of the pandemic (recovery), support the construction of sustainable competitiveness of the economy and increase the standard of living of the society in the long term (resilience). This will take place in particular through accelerating the development of a low-carbon, closed-cycle economy that makes responsible use of environmental resources (green growth), as well as development based on the use of digital solutions (digital growth).

Specific objectives of the NRP:

- Qualitative, innovative development of the economy leading to increased productivity, while also taking into account the digital transformation of the country and society;
- Green transformation of the economy and development of green, intelligent mobility;
- Increase in social capital and quality of life, in particular by ensuring the improvement of citizens' health and higher quality of education and skills adapted to the needs of a modern economy.

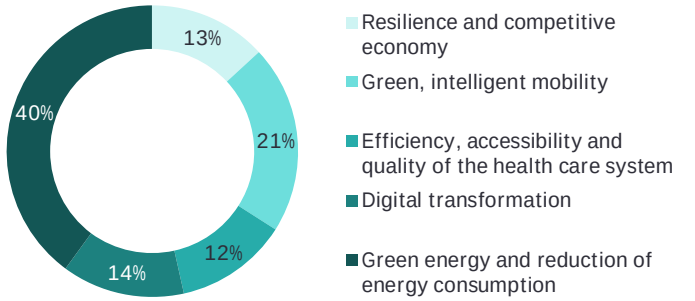
The horizontal objective of the NRP is to strengthen the social and territorial cohesion of the country.

Allocations

Total value of support for Poland
EUR 35.97B

Total value of support in grants (maximum)
EUR 23.9B

Total value support in loans (1/3 of maximum)
EUR 12.1B



Review of infrastructure programs | National Recovery Plan (NRP)

Key stakeholders

The main beneficiaries of the funds allocated in the NRP will be public institutions, including local governments and government agencies managing key transport, energy and other infrastructure. Opportunities for private investors to benefit from NRP funds have been limited to selected components. However, there is a wide range of opportunities for private capital involvement in the implementation of projects arising from the NRP, such as the supply of bus rolling stock, RES energy development and others. Information on selected projects planned for financing within the NRP is provided in the following chapters of the report.

Key components

Component		Grants (EUR)	Loans (EUR)
A	Resilience and competitiveness of the economy	4,455 million	245 million
B	Green energy and reduction of energy intensity	5,696 million	8,617 million
C	Digital transformation - increasing the use of digital technologies in the economy	2,797 million	2,100 million
D	Increasing access and strengthening the quality of the health care system	4,092 million	450 million
E	Green Smart Mobility	6,818 million	700 million

Possible interdependencies

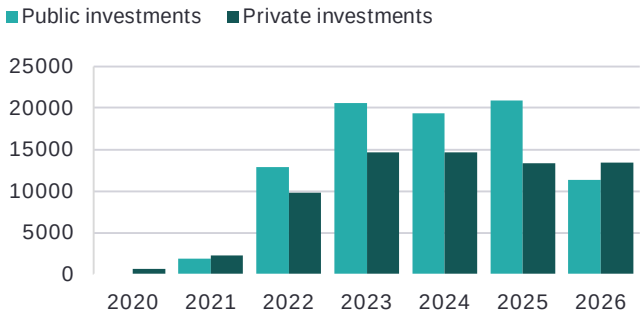
The coordination of the NRP implementation is the responsibility of the minister in charge of regional development and the servicing Ministry of Funds and Regional Policy (MFiRP). The coordination of the implementation of particular reforms and investments indicated in the NRP components is the responsibility of ministers competent with regard to a given thematic area and ministries servicing them or entities authorised by the relevant minister.

The MFiRP, as the Coordinating Authority of the NRP, is responsible for management, monitoring and reporting of the Plan. The MFiRP also represents Poland in contacts with the EC within the scope related to the preparation and implementation of the NRF.

Schedule

It was intended for the programme's implementation begin in the end of 2021 and be completed in 2026.

Planned distribution of NRP investment expenditure over the period 2020-2026



Review of infrastructure programs | National Recovery Plan (NRP)
Examples of NRP components

Component A2.2.1 – Investments in implementation of environmental technologies and innovations

This component aims to facilitate the transformation of enterprises towards a circular economy through supporting developing innovations related to: waste prevention; development and testing of innovative technologies for using waste as secondary raw materials; extending the life of products and reducing the negative environmental impact at every stage of a product's life cycle; development and implementation of resource and energy-efficient recycling technologies.

Covered Activities

- Use of secondary raw materials;
- Investments i.a. in R&D infrastructure to develop technologies for the use of waste as secondary raw materials;
- Implementation of environmental technologies, including those related to circular economy;
- Increasing Energy efficiency.

Potential Eligible Investments

Investments related to:

- Energy Rationalization/Efficiency
- Circular Economy (including R&D for new sustainable and/or recycled raw materials).

Budget for Component A2.2.1.
It is expected to be financed through non-refundable grants.

162m EUR

Component B2.1.1 – Investments in hydrogen technologies - production, storage and transport

This component aims to develop the market of renewable and low-emission hydrogen and other alternative fuels to achieve climate neutrality, increasing resilience of the energy system and strengthening the competitiveness of the Polish economy.

Covered Activities

Centralised and distributed systems for hydrogen production, storage, transport using the transmission and distribution network and its use as an end product, i.a:

- Construction of electrolysers using RES for hydrogen production,
- Construction and modernisation of transmission and distribution networks,
- Construction of facilities and infrastructure necessary for hydrogen refuelling,
- Construction of hydrogen storages.

Potential Eligible Investments

Investments related to:

- Energy Rationalization/Efficiency

Budget for Component B2.1.1
It is expected to be financed through non-refundable grants.

800m EUR

Review of infrastructure programs | National Recovery Plan (NRP)
Examples of NRP components

Component A2.1.1 – Investments supporting robotisation and innovations in enterprises

- This component aims to increase the level of digitalisation and robotisation in large enterprises, in order to improve their productivity as well as health and safety conditions at work. The main objective is to accelerate the transformation towards Industry 4.0 through development of digital and IT competencies in the area of design and manufacturing of computer devices.

Covered Activities

- Innovative solutions aimed at digital transformation;
- Transformation towards Industry 4.0 with particular focus on robotisation;
- Cloud technologies and AI;
- Implementation of Machine to Machine technologies, IoT;
- Reduction of environmental emissions and use of natural resources through the modern technologies
- Smart production lines, smart factories,
- Increasing digital security,
- Implementation of modern digital workplaces.

Potential Eligible Investments

Investments related to:

- Operations Transformation (Digitalization; Industry 4.0);

Budget for Component A2.1.1.
It is expected to be financed through non-refundable grants

450m EUR

Component B1.2.1 – Energy efficiency an RES in enterprises

This component aims to reduce final energy consumption and greenhouse gas emissions by increasing energy efficiency of production processes. It assumes decarbonisation of industrial enterprises (including enterprises in the energy sector) and increasing the share of low-emission sources of energy through investments in renewable and low-carbon energy sources and the efficient use of the energy produced.

Covered Activities

- Construction and modernisation of industrial and production facilities;
- Improvement of energy efficiency, including the replacement of fuels with more efficient sources;
- Construction and installation of own renewable energy sources and energy storage facilities;
- Increasing the share of the use of low-emission fuels in production processes;
- Thermo-modernisation of buildings and facilities used for industrial processes.

Potential Eligible Investments

Investments related to:

- Energy Rationalization/Efficiency
- Circular Economy (including R&D for new sustainable and/or recycled raw materials)

Budget for Component B1.2.1
It is expected to be financed through loans.

300m EUR

Review of infrastructure programs | European Funds for Infrastructure, Climate, Environment (FEnIKS)

General overview

The European Funds for Infrastructure, Climate, and Environment (FEnIKS) programme is the successor to the two editions of the Infrastructure and Environment Operational Programme (POIiŚ) (2007-2013 and 2014-2020). The EU budget allocation to the programme amounts to over EUR 25 billion, i.e. over PLN 114 billion. FEnIKS will be the largest programme in Poland and the European Union under shared management. In accordance with its name, it will be used to build infrastructure and improve the environment and climate. The programme will distribute funds from two principal EU programmes: the Cohesion Fund (CF) and the European Regional Development Fund (ERDF).

Funds will be invested in environmental, energy and transport projects, but will also support culture and health care sectors. In implementing FEnIKS, the Polish government will draw on its previous experience in implementing POIiŚ. Based on the cohesion policy regulation package, from the CF, at least 37% of funds are to be allocated to the implementation of climate objectives, and from the ERDF, at least 30%.

FEnIKS aims to improve the conditions for Poland's development by investing in:

- Decarbonising the economy and transforming it into an environmentally friendly, circular economy,
- Increasing the energy efficiency of housing, public buildings and enterprises and increasing the share of renewable energy sources (RES) in the final energy consumption,
- Building an efficient and resilient transport system with the lowest possible negative impact on the environment,
- Completing the Trans-European Network – Transport (TEN-T) core network by 2030,
- Ensuring equal access to health care and improving the resilience of the health care system,
- Strengthening the role of culture in social and economic development.

Main objectives

In its strategy, the programme will contribute in all sectors to the objectives of the European Green Deal, which aims to help transform the EU into a modern, resource-efficient and competitive economy:

- Achieving zero net greenhouse gas emissions by 2050
- Decoupling economic growth from resource use
- Where no individual or region is left behind.

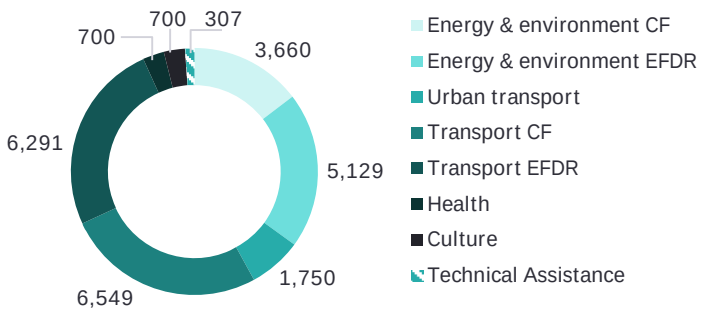
In addition, the Programme, following the objectives of the European Green Deal, is also expected to help recover from the COVID-19 pandemic. The objectives of the strategy will be implemented taking into account the starting point of the Polish economy and balancing economic, environmental and social objectives with the understanding that the ambitious environmental goals of the Green Deal cannot be achieved alone.

Allocations

Total allocation for Poland

25,085 bEUR

Allocations of FEnIKS by priorities (mEUR)



Review of infrastructure programs | European Funds for Infrastructure, Climate, Environment – FEnIKS

Key stakeholders

The main beneficiaries of the funds allocated in the FEnIKS will be public institutions, including local governments and government agencies managing key transport, energy and other infrastructure. Opportunities for private investors to benefit from FEnIKS funds have been limited to selected components.

Key components

FEnIKS was planned as a programme for the following investment areas:

- Energy efficiency and reduction of greenhouse gas emissions, development of system heat, RES, smart grids, energy storage systems, smart gas infrastructure
- Adaptation to climate change, water and sewage management, waste management, nature protection, environmental education
- Urban, railway, road, maritime, inland waterway, air transport
- Health, culture and heritage protection infrastructure.

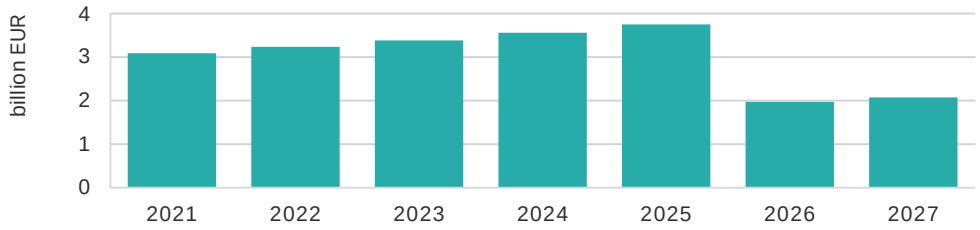
Possible interdependencies

Managing Authority Ministry of Funds and Regional Policy, Department for Infrastructure Programmes.

As part of the 2014-2020 financial perspective, PPP projects were successfully implemented, among others, in the waste management and energy efficiency sectors. Having the above in mind, in the course of the implementation of the Programme. The implementation of a project in the PPP formula shall be treated as equivalent to the traditional way, and in case of some sectors (e.g. energy efficiency), as preferred. In the case of certain sectors (e.g. energy efficiency), as a preference.

Schedule

Managing Authority Ministry of Funds and Regional Policy, Department for Infrastructure Programmes.



Review of infrastructure programs | European Funds for Infrastructure, Climate, Environment – FEnIKS | Strategic investments under FEnIKS

Transformation of the economy in a low-carbon direction:

- National Energy Consultancy Project (PDE)
  Q4 2023 – Q4 2029
- Comprehensive energy modernisation of selected state archive buildings in Poland
  Q1 2024 – Q4 2027
- Extension of the National Power System in order to ensure the security of the energy supply and enabling the connection of offshore wind farms (OWF)
  Q1 2021 – Q4 2028

Environmental projects:

- A group of projects for the implementation of investment activities defined in municipal plans and adaptation in the field of sustainable rainwater management systems and/or construction and development of green and blue infrastructure system (one or two strategic projects) strategic projects),
- Active protection project, implemented by GDOŚ (continuation of projects already implemented under OPI&E 07-13 and OPI&E 14-20).

Transport projects:

- Projects to complete the TEN-T core network
  Q1 2021 – Q2 2027
- Construction of missing road sections within Via Carpatia together with complementary sections
  Q1 2021 – Q4 2030
- Works on an alternative transport route between Bydgoszcz and the Tricity (continuation of investments from the perspective)
  Q2 2022 - Q2 2025
- Works on railway line no. 7 connecting Warszawa Wschodnia with Dorohusk, the Warsaw-Otwock-Dęblin section, stage II - phase II (section: Warsaw Wawer-Otwock)
  Q1 2023 - Q4 2025
- Investments in improving access to sea ports from the sea and land side, in particular to The Central Port in Gdańsk, the Outer Port in Gdynia, and the container terminal in Świnoujście,
  Q4 2025 – Q4 2027
- Investments in port infrastructure and safety in maritime navigation,
  Q4 2025 – Q4 2027
- Improvement of operational parameters on the Oder Waterway,
  Q4 2024 – 4th quarter 2028

Health:

- An oncology project is envisaged. The project is in line with the National Oncology Strategy,
  Q4 2023 – Q4 2026

Review of infrastructure programs | European Funds for Infrastructure, Climate, Environment – FEnIKS | Example component

FEnIKS - Components: 2.1 – Energy efficiency, Emissions reduction; 2.6 – Circular Economy

As part of Component 2.1., support will be directed to energy modernization of buildings, high-performance cogeneration, increasing the energy efficiency of manufacturing processes, increasing energy efficiency of the plant's media circulation systems, energy efficiency of auxiliary systems, including e.g. heat recovery systems from industrial processes and the installation of renewable energy equipment.

The aim of FEnIKS Component 2.6 is to effectively support the transition to a circular economy and effective waste management. The circular economy concept covers the entire product life cycle, therefore support will also be provided to the area of rationalization of the resource consumption of business activities, in the whole life cycle of products and services.

Covered Activities

- Increasing the energy efficiency of buildings, production processes and plant's media circulation systems,
- Production of electricity and heat in high-efficiency cogeneration processes,
- Development of heating and cooling systems, including thermal energy storage,
- Prevention of waste.

Eligible Expenses

To date, there is no information pertaining to the eligible expenses, however, based on similar programmes in the past, it is assumed that for energy efficiency projects eligible expenditures are focused on CAPEX with a particular emphasis on financing construction works.

Potential Eligible Investments

Investments related to:

- Energy Rationalization/Efficiency
- Circular Economy

Similarly to the case of the Polish National Recovery Plan, the FEnIKS is currently under discussion with the EC. More precise information and potentially, calls for proposals are expected to be available in Q1/Q2 2022.

It is expected to be financed through non-refundable grants and loans.

1,04m EUR

2.1 Energy efficiency

10m EUR

2.6 Circular Economy

Review of infrastructure programs | National Roads Construction Programme

General overview

The National Roads Construction Programme was prepared by the Ministry of Infrastructure and includes a list of investments in national roads planned by Poland to be completed by 2030.

The Programme also defines the objectives of the transport policy with respect to the construction of the TEN-T road network in Poland and complementary road links.

The National Road Fund is the basic source of financing for investments included in the Programme, supplied among others with EU funds. The financial limit of the new programme should allow Poland to complete practically the entire motorway and expressway network specified in the strategic plans for the motorway and expressway network.
The objective of the Programme is to create a coherent network of national roads ensuring effective operation of passenger and freight road transport. The improvement of the throughput capacity of the main arteries is one of the key elements that may increase the development dynamics of both individual regions as well as the whole country through the easier, faster and cheaper flow of goods and services.

The realisation of investments planned in the Programme will also allow to meet the inhabitants' expectations related to safe and fast communication.

In addition, the infrastructure gap between the western EU-15 countries and Poland will be reduced and the EU obligations concerning the construction of the TEN-T network, including the core network, consisting of priority connections, important for the implementation of the objectives of the European transport policy, will be met and its implementation will be completed by 2030.

Main objectives

The programme assumes a number of specific objectives:

- Increasing the cohesion of the Class A and S national road network (supplementing existing sections).
- Strengthening of road transport effectiveness (shortening the average travel time) and improvement of communication accessibility of cities and regions.
- Increase in road traffic safety (reduction of the number of accidents and their victims).

Implementation of the Programme will result in

- Increasing the density of express roads from 8.7 km/1000 km2 to 21 km/1000 km2
- Increasing the density of motorways and express roads from 14.3 km/1000 km2 to 27.9 km/1000 km2.

Allocations

A total amount of approximately PLN 292 billion will be allocated for the realisation of the investments included in the new programme. The financial limit includes new tasks worth ca. PLN 187 billion and continued tasks worth ca. PLN 105 billion.

Key stakeholders

The institution implementing the Programme assumptions is the General Directorate for National Roads and Motorways, which is subordinate to the Ministry of Infrastructure. Due to the necessity of complying with numerous environmental regulations an important stakeholder is the General Directorate for Environmental Protection, which issues relevant decisions authorising the construction of large infrastructure investments.

Review of infrastructure programs | Polish Energy Policy until 2040 (PEP2040)

General overview

Main objectives

The Polish Energy Policy 2040 (PEP2040) is a strategic plan for an energy transition for a sustainable future. It was developed between multiple ministries (primarily by the Ministry of Climate and Environment) and with support of consultancies, public bodies, non-profit organisations and industry consultations. Its main objectives are :

- A zero-emission energy system,
- Good air quality, and
- An equitable energy transition (ensuring that the cost burden of energy transition is borne in a fair manner by the society)

Key stakeholders

Due to its nature, PEP2040 encompasses a wide range of stakeholders:

- RES (PV, offshore and onshore wind, biomass), nuclear and power infrastructure developers
- Supporting industries: equipment manufacturers across entire value chains (power, heating, distribution, installation equipment), installers, digital solutions (infrastructure control and optimisation)
- Polish society (government, taxpayers funding the transition directly, citizens funding the transition through energy costs).

Key components

8 primary objectives of PEP2040

- Optimal use of domestic resources
- Development of electricity infrastructure (both generation and distribution)
- Diversification of sources of natural gas, crude and fuels and development of gas distribution infrastructure
- Expansion of energy market
- Nuclear energy
- Development of RES sources
- Development of district heating and cogeneration
- Increase of energy efficiency

Allocations / Schedule

There are various specific target allocations to objectives, which will result in considerable investments in the energy system (both public and private, driven by regulatory changes):

PV development to 10-16 GW by 2040 (currently approximately at 4 GW)

- Offshore development of 11 GW by 2040 (currently 0 GW)
- Increase the share of RES in the energy mix to 23% by 2030 (32% in power generation, 28% in district heating and 14% in transport). The current share of RES in power generation is 17.7%
- Nuclear energy capacity of 1-1.6 GW by 2033 (currently 0 GW)
- 100% of zero/low emission heating by 2040 (currently 2 mln households still use coal burners)
- Share of coal in power generation to fall to 56% from approximately 69% currently.

Interdependencies

PEP2040 is an evolving plan and remains in line with the agreed commitments:

- National Energy & Climate Plan 2030 – part of the EU Energy Framework 2030 – the most biding commitment established by all EU members
- EU Green deal (a 2050 vision for net-zero EU)
- UN commitments (Paris agreement, COP26, Sustainable development goals)

Review of infrastructure programs | Polish Hydrogen Strategy until 2030

General overview

Poland, with the hydrogen production at the level of around 1 million tonnes per year, is the 5th largest producer of hydrogen in the world and the 3rd in the EU, and accounts for around 10% of the total European Union's production of this gas.

The single largest producer of hydrogen in Poland is the chemical capital group Grupa Azoty (~42% market share), which produces hydrogen in its 4 plants in Puławy, Kędzierzyn-Koźle, Tarnów and Police, mainly for the production of ammonia used to produce nitrogen fertilizers.

Similarly as on the global scale, the majority of hydrogen in Poland is produced by steam-methane reforming.

Almost all of the hydrogen produced in Poland is currently used for internal purposes of its producers. The Grupa Azoty's external sales of the hydrogen accounts to only ~600 tonnes per year.

Large amounts of hydrogen are also produced by the PKN ORLEN and LOTOS capital groups

A document entitled "Polish hydrogen strategy until 2030 with a perspective until 2040", prepared by the Ministry of Climate and Environment was recently accepted by the Polish Council of Ministers in November.

Main objectives

Objective 1 - implementation of hydrogen technologies in the energy sector;

Objective 2 - use of hydrogen as an alternative fuel in transport;

Objective 3 - to support the decarbonisation of industry;

Objective 4 - production of hydrogen in new installations;

Objective 5 - efficient and safe distribution of hydrogen;

Objective 6 - creating a stable regulatory environment.

Key stakeholders

Large producers of hydrogen e.g. Grupa Azoty, PKN Orlen, LOTOS

Ministry of Climate and Environment

Polish Council of Ministers

Possible interdependencies

NRP (National Recovery Plan)

Three Seas intiative

Schedule / Allocations

By 2025, achieving the objectives of implementing hydrogen technology in the power and transport sectors and ensuring the planned production (50 MW of electrolyzers) will require investment of around PLN 2 billion. This estimate does not take into account the cost of electricity needed to produce hydrogen, the cost of maintaining hydrogen buses (fuel, maintenance) or the development of a transmission and distribution netowrk.

Between 2025-2030, the available knowledge only allows for the estimation of costs related to investments in electrolyzers, which will reach about PLN 9 billion, depending on the selected technology (alkaline/PEM/SOE), the purchase of further busesamounting to about PLN 4.4 billion, and refuelling stations, which will be about PLN 1.2 billion.

Sources of funding:

The hydrogen strategy suggests the creation of multiple national funds specifically geared towards hydrogen projects. The document put out by the government plans for at least 2.4 bln PLN in funds to be made available.

European funding:

Between Next Generation EU, InvestEU, CohesionPolicy, CEF - Connecting Europe Facility Energy, Transport, Innovation Fund, and Horizon Europe, there is €220-340 bn earmarked for RES electricity generation, €24-43 bn for renewable hydrogen, €65 bn for hydrogen transport, distribution & storage;

Key components

- Implementation of hydrogen technologies in the power industry, including the definition of the legal framework for their operation;
- Commissioning of a 1 MW class P2G installation based on polish technology - support for stabilization of operation of distribution networks; such an installation will produce 3 150 mwh of hydrogen/year
- Co-combustion of hydrogen in gas turbines (depending on the technical possibilities of the turbine)
- R&D support for the creation of co-generation and poly-generation systems for blocks of flats, small estates and public buildings from 10 kw to 250 kw with the use of fuel cells
- Technical analysis and feasibility of using large-scale salt caverns for hydrogen storage
- Launching co- and polygeneration plants, e.G. Medium-size CHP plants (50 mwt) where hydrogen will be the main fuel (demand ca. 580 gwh per year)
- Beginning of the use of hydrogen as an energy storage - approx. 4700 mwh of electricity produced with 11 gwh of energy input
- Installation of co-generation and poly-generation systems for blocks of flats, small estates and public buildings from 10 kw to 250 kw using fuel cells.

Review of infrastructure programs | Polish Nuclear Power Programme

General overview

The Polish Nuclear Power Programme is a strategic government document. It defines the tasks necessary for the construction of the first nuclear power plant in Poland.

The Programme update was adopted by the Council of Ministers on the 2nd of October 2020 and published in the Journal of Laws of the Republic of Poland, item 946 of October 16th, 2020.

The Program implementation schedule has been set out for the years 2020-2043. The Program defines the costs related to its implementation until 2033, i.e. the end of the 1st stage - commissioning of the first nuclear power plant.

Main objectives

The objective of the PNP Programme is the construction and commissioning nuclear power plants in Poland with a total estimated nuclear capacity ranging between approx. 6 and 9 GWe based on proven, large-scale, Generation III (+) pressurised water reactors.

The Programme provides for the use of pressurised water-type reactors with a unit capacity of over 1,000 MWe

Key stakeholders

Three main institutions are involved in the implementation of the Program:

- Minister responsible for energy - coordinates and promotes the polish nuclear power program;
- Investor – assures financing for the investment, obtains appropriate permits, conducts the construction of the nuclear power plant, as well as its commissioning and operation;
- The National Atomic Energy Agency as a regulator (nuclear regulatory body) - supervises the safety of a nuclear facility and its operations.

Key components

The implementation of nuclear energy in Poland will be based on 3 pillars: energy security, climate and environment, and economy.

The introduction of nuclear power plants will mean:

- Strengthening Polish energy security;
- A radical reduction of greenhouse gas emissions to the atmosphere from the power sector, low environmental external costs;
- Stopping or reducing energy cost increases for both individual and business customers.

Allocations

Expenditures related to the implementation of the PNP Programme (in PLN ,000s) up to 2033:

- Office supporting the minister in charge of Energy: 188.000
- National Atomic Energy Agency (PAA) – strengthening nuclear regulatory control: 400.350
- Total: 588.350

Interdependencies

The inclusion of emission-free nuclear energy in Poland's energy mix is due to the necessity to adjust to the goals of:

- The EU 2030 climate and energy framework;
- The European Green Deal.

Opportunities

Nuclear power projects in Poland require partners, as there is little no local expertise. NPPs and SMR projects would require strategic and technical support from the same partner, who also takes on financial risk.

According to the Polish nuclear power program, apart from the costs and timely implementation of investments, the greatest possible involvement of Polish companies is the most important factor taken into account by the government when selecting a contractor.

For the first planned NPP, three entities are competing - the American Westinghouse, the French EDF and the South Korean KHNP. Japanese firms could compete for the second NPP.

The scope for cooperation in SMR technologies is significantly wider, as many Polish companies are looking to utilize this technology, like the JV of Orlen and Synthos Green Energy

Schedule

Nuclear power plant 1 (EJ1):

2022 - an environmental and location decision is obtained;

2026 - a building permit is obtained and construction commenced;

2033-2037 - an operating permit is issued by PAA President and 3 nuclear power plant units are commissioned (EJ1).

Nuclear power plant 2 (EJ2):

2028 - an environmental and location decision is obtained;

2032 - a building permit is obtained and construction is commenced;

2038-2043 - an operating permit issued by PAA President and 3 nuclear power plant units are commissioned (EJ2).

Review of infrastructure programs | Solidarity Transport Hub

General overview

The Central Transport Port is a planned interchange between Warsaw and Łódź that will integrate air, rail and road transport. As part of this project, 37 km west of Warsaw, on an area of approximately 3,000 hectares, the Solidarity Port will be built, which will be able to handle 45 million passengers a year during the first phase.

The new facility will replace the existing Chopin Airport in Warsaw.

Until the COVID-19 pandemic, the Warsaw Chopin Airport and LOT Polish Airlines were experiencing a period of dynamic growth which needed to be facilitated.

The delivery scheme may either assume an EPC or a direct, intergovernmental agreement setting up the project environment.

The Government set up „STH", a SPV responsible for the delivery and assurance of all work streams of the project.

Estimated CAPEX

bEUR 7.7

General overview

Airport

- Construction of a new airport with a target capacity up to 100 million PAX.
- First phase (36 million PAX) planned for 2027

Rail

- The investment also includes a railway station, closely integrated with the airport and at the same time a landmark of the future airport city and aerotropolis with the following assumed operational and infrastructural parameters:
- Construction of 1,600 km of new lines from 10 directions, including high speed rail.
- Achieving a 120 mins travel time from most Polish cities

Highways

- In accordance with the assumptions of CPK's location adopted in the Concept, its service in terms of road transport should be provided in particular by the A2 motorway and the Outer Warsaw beltway.
- The S10 road was proposed as a significant improvement in the road network linking CPK with the region of Płock and the Kujawsko-Pomorskie voivodeship, as well as with the northern section of the A1 motorway running through it.

Other investments

- Airport City is a services complex located within, or in the immediate vicinity of an airport and having a close functional link to the airport (car parks, service buildings, logistics centre).
- CPK also assumes an increase in air and rail freight traffic, which is to be facilitated by the location of a container terminal within the railway junction. Assumptions regarding the container terminal have not been developed.

4

Infrastructure projects beyond the borders of Poland under the Three Seas Initiative

Three Seas Initiative | Introduction

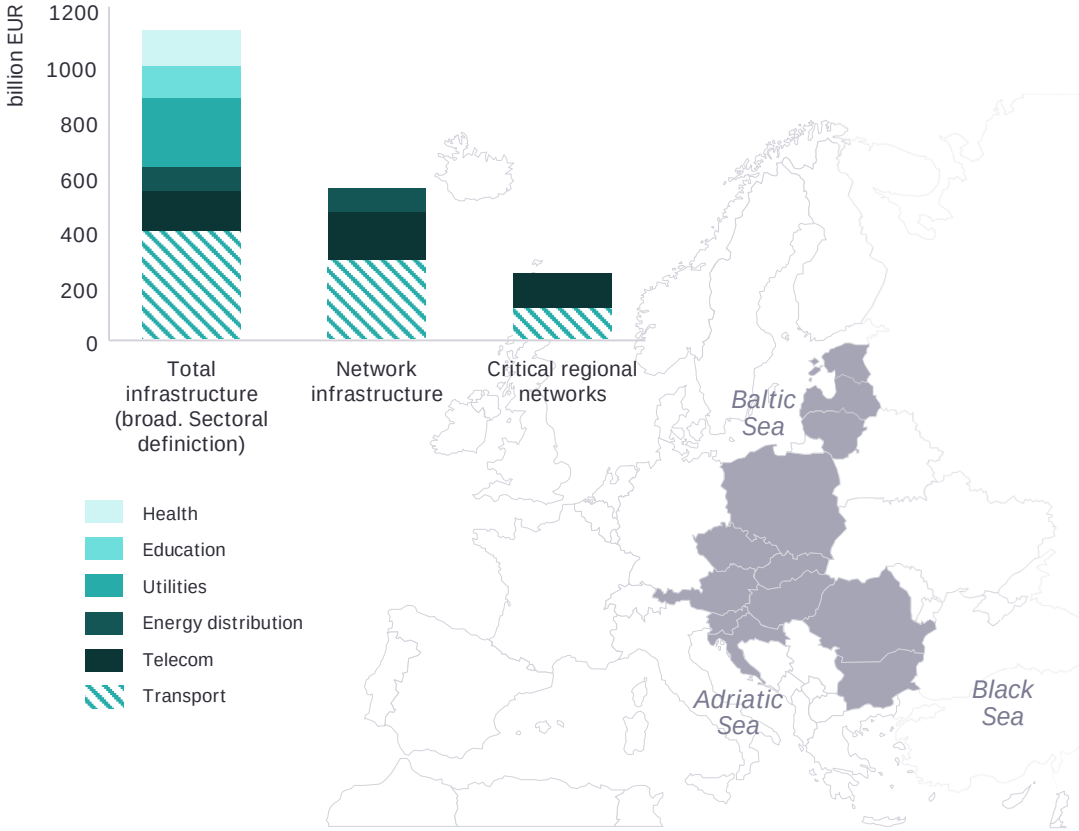
The Three Seas Initiative was established as a forum for cooperation between 12 countries: Austria, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

The Three Seas Initiative members constitute almost one third of the European Union's total area, with more than 112 million people living in the region. The idea of creating a sphere of deepened cooperation, which was named the Three Seas Initiative, was launched in 2015 by the presidents of Poland and Croatia. In the declaration adopted at the group's first summit in Dubrovnik that year, it was emphasized that "the Three Seas countries and their potential to create a dynamic region whose development depends, among other things, on the coordination of the entire region's efforts".

The priority for the Three Seas Initiative is to build a coherent and well-integrated infrastructure in Central Europe that will make it possible to overcome the infrastructural backwardness resulting from geopolitical history. The Three Seas project aims to reduce infrastructural and economic disparities of the common European market, which will limit the division of the EU into less and more developed areas of integration.

The most important added value of the Initiative is that it ensures political support at the highest level of state authorities for investments, which have remained a neglected field in the cooperation of Central European states. The Three Seas Initiative is thus a pro-European project which is complementary to existing formats of regional cooperation.

Demand for infrastructure investments in the Three Seas countries in the years until 2030, using various definitions of infrastructure



Three Seas Initiative Investment Fund

The Three Seas Initiative Investment Fund is an investment vehicle to finance key infrastructure projects in the Three Seas region.

The main objective of the Three Seas Fund is to invest in transport, energy and digital infrastructure on the north-south axis in the Three Seas countries and to offset the differences in the development of individual regions within the European Union.

Its role is to complement and strengthen the capital deployment of individual Three Seas countries and European Union financial instruments. The fund is a commercial and market driven initiative that will grant diversified investment opportunities and an attractive return to the investors.

Three Seas Initiative Investment Fund in the transport sector

The Three Seas Fund announced that it has made its first investment acquiring a 100% stake in Cargounit, a key player in the CEE railway industry.

Cargounit is the largest private locomotive leasing company in Poland and the sixth largest company in the rolling stock industry in Europe. It is the market leader in Central Europe. Cargounit's rolling stock is mainly used by carriers from the petrochemical, chemical and metallurgical industries, as well as for intermodal transport and the transport of aggregates. The company has a fleet of 175 locomotives, including 96 electric units and has been operating for 17 years.

Rail transportation plays an increasingly important role in the movement of goods in Europe – it facilitates trade and reduces the negative impact of transport on the environment, notably carbon dioxide emissions. The increase in the scale of Cargounit's operations, which will be funded as part of the Three Seas Fund's ownership, will positively affect the development of cargo connections and improve trade links across the Three Seas region. The company plans to expand into neighbouring countries, which will lead to the strengthening of north-south connectivity between the countries of the Three Seas Initiative.

(Roads ued on next page)

bEUR 165

Railroads

bEUR 100

Airports

bEUR 11

Inland and maritime

bEUR 13

Total estimated investment needs

bEUR 290

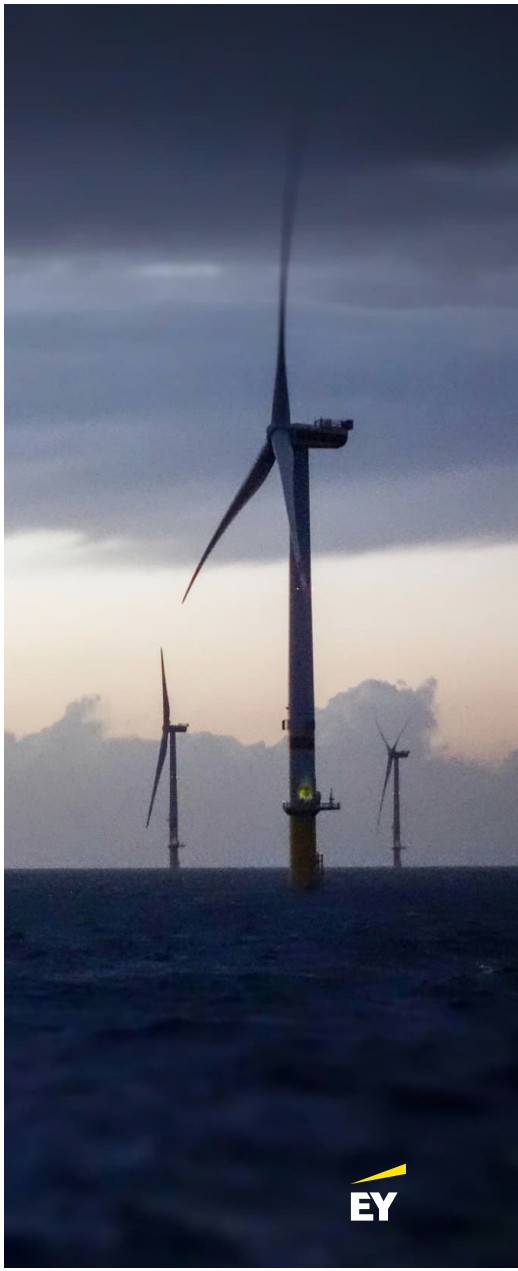
Three Seas Initiative | Transport project

The Three Seas Fund is a dedicated commercial fund targeting infrastructure investments in Central and Eastern Europe ('CEE'). The Fund will invest in energy, transport and digital infrastructure in the European Union ('EU') CEE member states which border the Baltic, Adriatic and Black Seas, where the demand for long-term commercial investment into national infrastructure is among the highest in the EU.

From February 2020, the fund began full operational activity. Decisions on the selection of projects are made by an investment committee independent of investors. The Fund's investors appointed Amber Infrastructure to act as the investment advisor, responsible for originating investments, asset management and the process of attracting private investors to the fund.

Key transport projects

- Baltic – Adriatic TEN-T Core Network Corridor
  The Baltic-Adriatic Corridor links major nodes (urban nodes, ports, airports and other transport terminals) through key rail, road, maritime and air transport connections from North to South.
- Danube-Oder-Elbe Connection
  Project of the multifunctional inland waterway corridor connecting Baltic Sea, Black Sea and North Sea, including energy, water management functionalities.
- Diversification of gas supply sources and integration of gas infrastructure in the Three Seas Region
  Diversification of gas supply sources and integration of gas infrastructure in the Three Seas Region with the implementation of the Baltic Pipe project and cross-border interconnections Republic of Poland-Slovak Republic and Republic of Poland-Ukraine.
- Rail Baltica
  Rail Baltica is a greenfield rail transport infrastructure project with a goal to integrate the Baltic States in the European rail network. The project directly includes five European Union countries – the Republics of Poland, Lithuania, Latvia and Estonia and indirectly, the Republic of Finland. Rail Baltica means 840 km of new railway infrastructure in Lithuania, Latvia and Estonia and 370 km of modernized infrastructure in Poland.
- Via Carpatia
  Via Carpatia is a route running on the North-South axis between the Baltic, Aegean, Black and Adriatic Seas, thus embedding into the process of advancing economic and territorial cohesion of the European Union, and contributing to the social and economic development of Central and Southern Europe. The section in Poland to be completed in 2026. Total length: 718 km of the main route. Of these 78 km are completed, 289 km are under construction, 351 km are under preparation.



Three Seas Initiative | Energy projects

General overview

The TSI has it's own fund, which is an investment vehicle for financing key projects. The National Promotional Institutions from the participating countries are co-founders. The fund is advised by Amber Infrastructure Group since 2019.

There is room for involvement in the fund from other parties including private institutional investors, international multilateral financial institutions and international development institutions. Therefore Japan is eligible to participate in the Fund.

The US has already participated in the Fund using its International Development Finance Corporation to invest 300 USD millions in Energy infrastructure to make the region less dependent from Russia and China for Energy needs.

Main objectives

The countries involved in 3S share the same objectives: economic growth, security and a stronger and more cohesive Europe. To achieve these goals, cooperation is promoted for the development of infrastructure in the energy, transport, and digital sectors.

Energy security is among the most important objectives. Energy is not only an economic issue, but has also become a strategic and security concern. A cohesive, well-functioning energy market and the freedom to choose between suppliers will increase open competition, ensure that the region is better supplied, and boost energy security. Furthermore 3S initiatives will make participating countries less dependent from Russia, which could increase their security

Key stakeholders

- European Union member countries
- The United States
- Private funds
- Various private company partners
- Amber Infrastructure Group – Fund's adviser

Key components

- Investment fund 3 SIIF
- There are 90 registered projects:
- Road and rail infrastructure projects - 49% of registered projects
- Energy projects – 37% of registered projects
- Digital – 14% of registered projects

Allocations

- An initial commitment of €500 million (about $602 million)
- As of April 2021, 9 of the 12 3SI countries have pledged contributions totaling about €1 billion ($1.2 billion).
- The fund's current target is to raise €3 billion to €5 billion ($3.6 billion to $6 billion)

Possible interdependencies

- European Green Deal
- National Recovery Plans (NRPs) of participating countries
- National Energy Sector Development Plans
- EU Funds
- European Investment Bank Funds
- The Connecting European Facitlity – EU Funding instrument

Schedule

- 2015 – The TSI was launched by the by the presidents of Croatia and Poland
- 2016 – Dubrovnik (Croatia): the first summit and a Joint Statement about expanding the existing cooperation
- 2017 - Warsaw (Poland): Summit, attended by the President of the United States, Donald Trump.
- 2018 – Bucharest (Romania): Summit, the signing of the Letter of Intent to set up the investment fund for the realization and financing of the key infrastructure projects
- 2019 – Setting up the fund with an initial commitment of €500 million (about $602million) from development banks in Poland and Romania
- 2019 – Amber Infrastructure Group announces its appointment as the exclusive investment adviser to the Fund
- 2021 - 9 of the 12 3SI countries have pledged contributions totaling about €1 billion ($1.2 billion)

Three Seas Initiative | Energy projects

High-potential investment opportunity

Future investments from public and private investors are expected to reach €3–5 billion, and the aim is to secure involvement in projects with a total value of up to €100 billion. The fund is managed by London-based Amber Infrastructure Group, which guarantees that decisions supported by political objectives will be made independently and in a transparent manner.

According to the fund's management board, the fund's expected gross return is 12-15 per cent, which makes the fund a high return investment for foreign investors. It is worth indicating that Amber identifies and integrates ESG factors into all aspects of the investment, development and management, to protect and enhance value.

The sums raised are still not sufficient to invest in all valuable projects, therefore strong interest from foreign investors is expected in the future. There are advanced talks taking place with development banks in the US and with global private capital.

The multitude of 3SI projects will require advanced technology and know-how (e.g. in renewables) which are not offered by the companies in the region.

Three Seas Initiative | Energy projects

General overview

There are 38 Energy projects on the List of Priority Interconnection Projects to be realized by the Three Seas Initiative members.

Only one project from the list is already realized (Compressor Station 1 at the Croatian gas transmission system).

There are eight projects which are already in substantial progress and three where some activity was reported.

There are still more than 25 projects which will be realized and where Japanese enterprises could take part as an investor.

Of the 38 registered and active energy projects currently presented in the 3SI database, fossil gas projects outnumber renewables projects by more than two to one:

- 18 fossil gas infrastructure projects (pipelines, LNG terminals, a power plant, and a compressor station)
- One unconventional fossil gas extraction project
- One pilot green hydrogen power plant project and one hydrogen research center project
- Eight renewable energy projects (a solar plant, two wind farms, three smart grids, and two battery storage projects).

Since 2021, the number of new renewables projects is increasing, whereas number of gas projects is stable. This is a result of ambitious of 3SI participants to be climate-friendly and fully aligned with the goals of the Paris Agreement and the European Green Deal.

Most of the gas projects under consideration in the 3SI nations are now in contradiction with national goals. Therefore, a majority of them will probably be not realized and Japanese enterprises should focus on renewables projects.

Energy projects with a high degree of probability of implementation

Description	Value	Project maturity	Comments
Connection of offshore wind farm to the electricity transmission grid of Lithuania	EUR 200 m	2020-2023 Planning and Preparatory work 2024-2028 Construction	Following goals stated in the Lithuanian National Energy Independence Strategy and National Energy and Climate Action Plan, the Ministry of Energy of Lithuania is set to announce a tender to select the owner and developer of a 700 MW offshore wind farm to be built off the coast of Lithuania in the Baltic Sea. The 700 MW wind farm in the Baltic Sea will cover up to 25 percent of Lithuania's annual electricity demand, thus reducing the need for electricity imports. The tender is scheduled to be held in 2023. It may or may not require interested parties to include costs of electrical connection to the mainland grid in their auction bids. The responsibility of offshore grid development is yet to be decided and approved by the Parliament of Lithuania (Seimas). It is expected that related laws shall be approved in 2022. In both cases – if the connection responsibility is assigned to the electricity transmission system operator (hereinafter – TSO) or wind farm investor, the offshore wind connection project may benefit by attracting financing from the 3SIIF. The scope of the connection project, includes but not limited to, the construction of an offshore substation, the laying of offshore export cables, the expansion of the onshore substation to which the wind park shall be connected. Prior to the auction, the approved spatial planning and environmental procedures – the special plan, the strategic environmental impact assessment, and the environmental impact assessment – will be performed by the Lithuanian Energy Agency.

Three Seas Initiative | Energy projects

Energy projects with a high degree of probability of implementation

Description	Value	Project maturity	Comments
Development of a Wind Farm Project - Latvia	EUR 171 m	Planning and preparatory work	Laflora's project enables for the development of a green industrial zone in the Jelgava Region. By attracting companies with high energy consumption, developing new products in accordance with the new climate priorities, as well as producing renewable hydrogen will significantly increase the share of renewable energy resources in Latvia's balance of energy resources and help Latvia achieve the National Energy and Climate Plan goals by 2030 (50% share of RES in final electricity consumption).
PWenergy - Geothermal Power Plant Presov - Slovakia	EUR 162 m	Current project status: ▸ Geological survey completed. ▸ Land plots for project development have been identified and contracted. ▸ EIA has been filed at the end of March 2021, with expected duration of 12 months. ▸ Drilling of the exploration well is planned for Q2 2022. ▸ Budget is not secured.	The primary objective is the generation of electricity using geothermal energy sources and the subsequent cascade use of residual heat for district heating, greenhouse heating, wastewater treatment, heating of public pools and other industrial and food production processes. ▸ The anticipated annual production of energy in the fully developed project: Electricity (19 MWe) ≈ 140 GWh / year and Residual heat (34 MWth) ≈ 80 GWh /year. ▸ Geothermal projects have an exceptionally low life-cycle greenhouse gas emission production compared to regular energy sources, even lower than some other renewable energy sources. ▸ In closed-loop binary-cycle power plants, where the extracted geothermal fluid is passed through a heat exchanger and then completely injected, the operational CO2 emissions are near zero.

Three Seas Initiative | The 3 Seas Digital Highway

General overview

The concept of supplementing gas and road infrastructures being built as part of the Three Seas Initiative with a resilient digital component

Main objectives

- Connects the North and South of the Three Seas
- The Backbone of Cyber resilient
- Digital Infrastructure
- Joint cross-border cyber resilient digital infrastructure projects that enable better and more secure data transfer from North to South and bridges the gaps in communication infrastructure, including fibre optics and 5G technology infrastructure
- Provision of potential to grow in the *data economy*

Key stakeholders

- 3SI countries proposing the project: Poland
- Participating 3SI countries: Austria, Czechia, Latvia, Bulgaria, Lithuania, Poland, Croatia, Estonia, Hungary, Romania, Slovakia, Slovenia
- Relevant 3SI ministries (digital affairs, infrastructure, economy, foreign affairs)
- 3SI national, sectorial and regional chambers of commerce
- Private entities (operators) tasked with project implementation

Key components

- Cyber resilience
- Fibre optics, 5G networks along important transport routes
- Gigabit and wireless connectivity to institutions and local communities

Allocations

Budget not defined at this stage of the project.

The 3 Seas Digital Highway is coherent with a funding programme focused on transport, energy and digital infrastructure within the trans-European framework network - Connecting Europe Facility.

To support infrastructure projects connecting regions within the EU for the period of 2021-2027, the EC proposed the allocation of a total budget of €42.3 billion. The digital envelope for improving digital connectivity (very high capacity broadband networks that are crucial for modern digital services) was scheduled for €3 billion.

Financially eligible projects are:

- 5G networks along important transport routes
- Gigabit and wireless connectivity to institutions and local communities

Schedule

- 2020 – 2021 Planning (feasibility study, searching potential contractors, financing options)
- After 2021 Planning (no implementation timeline for this stage
of the project)

Three Seas Initiative | Central European Drone Demonstrator (CEDD)

General overview

The idea of the initiative is to develop the U-space, low altitude space as a new field of the economy. Central European Drone Demonstrator (CEDD) is an initiative focused initially on the area of Upper Silesia and the Dąbrowski Basin, which aims to integrate the environment of unmanned aerial vehicles (UAVs, drones). CEDD creates a cooperation platform between producers, service providers, service recipients and regulators on the emerging new economy field, the so-called U-space.

Main objectives

- Organizes a platform of communication and cooperation in the construction of the ecosystem and value chain, combining technology suppliers and integrators, clients, academia, local governments and public administration, as well as financial institutions and investors
- Creates space for the integration of entities in projects creating the market for unmanned technology applications
- Supports the acquisition and development of competences in the technologies of unmanned and autonomous vehicles

Key stakeholders

- 3SI countries proposing the project: Poland
- Partner countries: Ukraine, Moldova
- The sponsor of the CEDD programme is the Ministry of Infrastructure, programme proposed by the Civil Aviation Authority and the Polish Airspace Navigation Agency along with the GZM Metropolis – situated in Silesia Region in South-West Poland, Port of Gdynia (Baltic Sea) and Sieć Łukasiewicz. The three entities are responsible for the implementation of the programme
- Supporting partners of the CEDD are the Polish Development Fund, a spin-off of Jastrzebska Spolka Weglowa – Hawk-e and DroneRadar – a provider of an European UAV's Traffic Management System

Key components

- Create rules for the operation of the UAVs market
- Implement the aviation and IT/Telco infrastructure ensuring safe and effective use of low-altitude space

Allocations

- €25M
- Financing sources: to be determined
- The CEDD is at is initial stage and the budget is not secured yet. Due to the great potential of the CEDD for the whole economy and its transformational effect, financing from state budgets may be considered. The financing may also come from the 3SI Fund, venture capital and private equity
- The financing needs at the initial (1st) stage may be estimated for approx. EUR 25 m (only Poland was concerned) but at the later stages, the needs will be much higher (against benefits that will come quickly
- According to the EC preliminary estimates, the U-space R&D budged for U-space environment will amount to EUR 3 billion

Schedule

- Planning (status: registered)

5

Selected infrastructure projects

Selected infrastructure projects | Introduction

This chapter provides information on selected infrastructure projects that are planned or already being prepared for implementation in Poland.
The projects are divided into 3 categories: transport, energy and IT & telecommunications.

Each project is described with respect to their basic assumptions, objectives, the status of work preparation and a preliminary assessment of the possibility of involving private partners and investors.

Name of the project

Selected Infrastructure projects | Transport

Outer Warsaw beltway – STH access roads

Description

The Outer Warsaw beltway is a strategic highway for the country, the need of which has been signalled for years. According to current assumptions, it is to be the main road connection to STH and the basic element of the road network allowing to move transit traffic from the Warsaw metropolitan area.

The Outer Warsaw beltway will improve the connection of the capital city with the Bydgoszcz-Toruń agglomeration and the sea ports in Szczecin and Świnoujście (via the S10 expressway), the Tri-city and Kraków agglomerations (via the S7 expressway), the northern part of Poland and Via Baltica route (via the S8 and S61 expressways), the Łódź and Wrocław agglomerations and the southern border of Poland (via the S8 expressway) and the Lublin agglomeration and the south-eastern border of Poland (via the S17 expressway). Thanks to the connection with the A2 motorway, the Outer Warsaw beltway will improve access to the western and eastern borders of Poland.

Key project components

The main focus of the project is the construction of a dual carriageway motorway with a total length of around 100 km. Together with the Outer Warsaw beltway, the S10 road towards Szczecin and the extension of the A2 motorway linking Lodz and Warsaw by 3 lanes are being analysed.

Project maturity

The mode of expressway construction in Poland depends on the milestones, the most important of which being obtaining the Environmental Permit (EP). On the basis of the EP, the Program Concept of the investment is developed, which defines the technical project assumptions.

After the creation of the Program Concept, a public tender for the design and construction is announced – included in one contract. Investment design allows for the optimization of the project for the contractor.

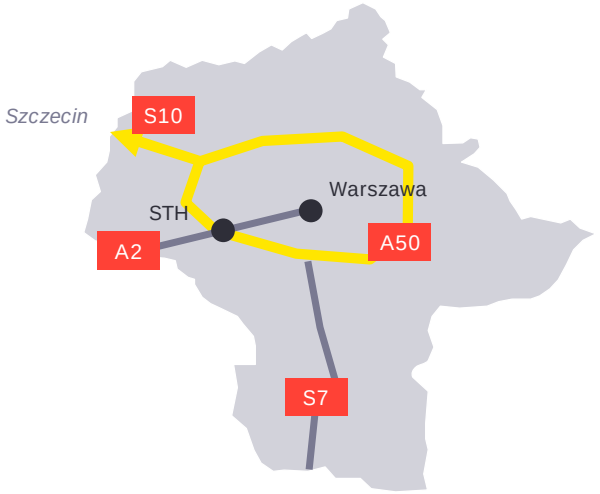
According to GDDKiA plans, the first sections of the Outer Warsaw beltway could be ready at the turn of 2027 and 2028, and the whole route should start to be passable in 2035. A public consultation is currently ongoing to determine the route of the motorway.

Comments

Due to the very high value of the project and the extensive scope included in the STH concept, there is great potential to use foreign contractors. The construction investor is the road infrastructure manager in Poland, GDDKiA, which selects contractors through public tenders.

Estimated CAPEX

bEUR 2.4



Selected Infrastructure projects | Transport

S19 expressway – part of the Via Carpatia route

Description

The S19 expressway is part of the Via Carpatia international route, connecting the northern and southern parts of Europe. In Poland, this route will be over 700 km long and will run through the Podlaskie, Warmińsko-Mazurskie, Mazowieckie, Lubelskie and Podkarpackie voivodships. In Podkarpacie, where terrain conditions due to mountainous sections will be the most demanding for the construction process, it will be about 169 km long.

The S19 expressway will ultimately connect the Lithuanian seaport of Klaipeda with the seaport of Thessaloniki (Greece) and the seaports of Romania and Bulgaria on the Black Sea. Due to its route, it fits perfectly into the Three Seas Initiative, although it is not directly subject to cooperative implementation.

Project maturity

Currently about 84.5 km of the S19 road is in the process of construction in the popularly used system of investment implementation in Poland, which assumes commissioning the design and construction in one order.

About 54.1 km is at the stage of preparing the investment to be tendered out, including 3 sections for which the programme concept is being prepared.

Key project components

The construction of the S19 expressway is divided into more than a dozen sections. In 2021, the major part of the connection between Rzeszów and Lublin was ready for operation, for which only a few dozen kilometres are missing. North of Lublin, towards Bialystok, and north of Bialystok towards the border with Lithuania, the progress is much lower, as preparatory work is currently underway.

The most difficult and costly section is the construction of an expressway south of Reszów towards the border with Slovakia. This section runs through a mountainous area of the Carpathians. Currently only a few kilometres section near Rzeszów is under construction.

Comments

Due to the technological complexity of the project, it is potentially interesting for designers and contractors with advanced technical competence and experience in the construction of large infrastructure especially in the construction of infrastructure in mountainous areas. The construction investor is the road infrastructure manager in Poland, GDDKiA, which selects contractors through public tenders.

Estimated CAPEX

bEUR 1.5*

*value for the southern section

Selected Infrastructure projects | Transport

S6 – Western ring road of Szczecin

Description

The Szczecin Western Bypass (ZOS) will be approximately 50 km long. It will bypass the Szczecin agglomeration from the west and north. The road will pass under the Oder River through a tunnel in the vicinity of Police. The tunnel had to be extended from 3.5 km to 5 km in the vicinity of the industrial facilities of the Police Chemical Plant. It will be the longest of its kind in Poland.

The objectives of the project are

- Pushing back heavy (incl. Dangerous chemical goods) and transit traffic from szczecin
- Significant reduction of accident risk, thus increasing the safety of residents
- Reducing exhaust gas and noise emissions
- Development of areas adjacent to the ring road and construction of logistic centres
- Shortening of travel time

Key project components

The new route will be an alternative to the existing S3/A6 route, which bypasses Szczecin from the south and east, and together will form a ring around the city. The road will significantly improve communication between the entire Szczecin agglomeration and the expressway and motorway network in the West Pomeranian Voivodeship.

It will be of particular importance for Police, located to the north of Szczecin. Currently, to get from Police to the S3/S6 Goleniów Północ junction, one has to drive 58 km, including the centre of Szczecin. Once the ring road is built, the route will be shortened to 23 km, and travel time reduced several times. A considerable part of motor traffic will be diverted from the centre of Szczecin, including vehicles going to the chemical plant in Police.

A particularly important element of the project is the tunnel under the lower section of the Oder River, which will be 5 km long.

Project maturity

An environmental decision for this investment has been in place since 2017. Conceptual planning documentation has also been developed, along with ground studies.

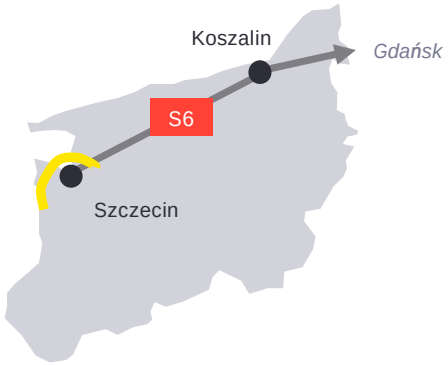
The investment is included in the project of the National Roads Construction Programme till 2030. Previously, it was planned to be executed under the formula of a Public-Private Partnership. The Szczecin division of GDDKiA has announced a tender for the preparation of project documentation.

Comments

Due to the technological complexity of the project, it is potentially interesting for designers and contractors with advanced technical competence and experience in the construction of large infrastructure structures at the combination of hydrology and civil engineering. The construction investor is the road infrastructure manager in Poland, GDDKiA, which selects contractors through public tenders.

Estimated CAPEX

bEUR 1.1



Selected Infrastructure projects | Transport

Railways to the STH airport including High-Speed railway Warsaw – Łódź

Description

The STH railway investments include a total of almost 1,800 km of new lines, which are to be built by the end of 2034. The CPK Railway Programme consists of a total of 12 railway routes, including 10 so-called spokes leading from different regions of Poland to Warsaw and the STH. In total, there are 30 investment tasks.

Project maturity

The first construction works are to start as early as 2023. The entire investment will be implemented between 2023 and 2034. Currently, a public consultation is ongoing to determine the route of the railways. For the Warsaw-Lodz section, a contract has been awarded for the preparation of the technical-economic-environmental study to IDOM, Multiconsult, Transprojekt Gdanski and Arcadis.

Estimated CAPEX

mEUR 8.8

Key project components

The main part of the railway construction will be to connect Warsaw – Lodz (140 km). As a result, a high speed railway will be created between Warsaw, the STH and Łódź, and further Wrocław and Poznań, which concept is sometimes referred to „Y" because of its shape.

In Mazovia, as part of the STH railway programme, a total of about 344 km of new railway lines will be constructed, of which the STH company is the investor, and another 654 km will be modernised by PKP PLK. In Łódzkie, about 219 km of new railway lines will be built and another 305 km will be modernised.

Comments

The schedule assumes that the high-speed line between Warsaw West and Łódź will be launched simultaneously with STH, i.e. in 2027. Thanks to this investment, passengers will reach the new airport: from Warsaw in about 15 minutes, from Łódź in about half an hour, and from Warsaw to Łódź in about 45 minutes (almost twice as fast as today). Trains with passengers will travel at speeds of up to 250 km/h. The design assumptions adopted by the STH company will enable it to be increased in the future even to 350 km/h.

For the high-speed line, it is assumed that about 20 trains will be purchased in the first phase of its operation and another 24 in the next phase. The production of trains and the construction of high-speed railway lines are potentially interesting projects for foreign contractors.

Selected Infrastructure projects | Transport

Railway Podłęże-Piekiełko

Description

Modernization of railway, part of TEN-T, planned Amber Rail Freight Corridor and Podłęże-Piekiełko investment. Total length of railways is 133 km .

Project maturity

Task assumed to be financed from the funds of the National Rail Construction Programme.

Two stages of investment – Stage II: modernization and Stage III: construction of new railway.

Estimated CAPEX

bEUR 1.63

Stage II – bEUR 0.7
Stage III – 0.94

Stage III: new railway construction
Stage II: Railway No. 104 modernization
Main railways
Note: Only selected railways are presented on the map.

Key project components

Challenging mountainous area with numerous tunnels, bridges and viaducts planned to be modernized (Stage II: 75 km Nowy Sącz – Chabówka) and construction (Stage II: 58 km).

Comments

Due to the mountainous location of the railway lines to be built and upgraded, it will be challenging to build and will require specialist skills. For this reason, contractors with experience in mountain construction will be of potential interest. The construction investor is the rail infrastructure manager in Poland, PKP PLK, which selects contractors through public tenders.

Selected Infrastructure projects | Transport

New rolling stock for PKP Intercity

Description

PKP Intercity is the national rail passenger operator and it intends to modernize and expand its rolling stock over the coming years. With the ongoing modernization of the railway network and its expansion into high-speed sections, the company intends to adapt its rolling stock for maximum speed and to meet the growing demands of the market.

Project maturity

Project assumed to be financed from the funds of the NRF between 2021-2026.

The rolling stock will travel on lines built under the Solidarity Transport Hub Programme. In February 2022, Solidarity Transport Hub Company announced a preliminary market consultation for producers to procure rolling stock that will operate the new high-speed rail network.

Key project components

According to the PKP Intercity rolling stock purchase strategy it is planned to:

- Purchase 38 push-pull double-deck wagons for inter-agglomeration connections (e.G. Warsaw - Łódź, Kraków - Katowice) together with 45 multi-system locomotives adapted to a speed of 200 km/h
- Purchase of over 500 new wagons adapted to a speed of not less than 200 km/h
- Purchase of 63 (+ option 32) multi-system locomotives operating trains at a speed of 200 km/h;
- Purchase of 16 hybrid diesel-electric locomotives with a maximum speed of 160 km/h in electric traction and 120 km/h in diesel traction
- Purchase of 20 hybrid trainsets with a maximum speed of 160 km/h.

Comments

Plans to purchase new rolling stock for high-speed railway lines is a potentially attractive order for foreign manufacturers, as Polish producers do not have such advanced technology.

PKP Intercity is a state-owned railway operator, belonging to the PKP Group, which is the parent company for many entities, e.g. infrastructure managers, cargo operators, etc. This type of procurement does not discriminate in any way against manufacturers from other countries (as long as they comply with relevant EU regulations), as it is based on transparent public tenders, usually preceded by a technical dialogue. This technical dialogue allows for discussions with manufacturers to align their expectations with the market's capacity to deliver. As a rule, specific procurement requirements will appear at the level of technical solutions, e.g. track gauge (the Polish gauge is 1435 mm), interoperability or availability of space to carry bicycles etc.

Also the scale of the planned purchases (bEUR 0.96) related to the high-speed rolling stock will generate interest from foreign suppliers and manufacturers.

Estimated CAPEX

bEUR 0.96

Selected Infrastructure projects | Transport

Third metro line in Warsaw

Description

Warsaw keeps expanding its underground network, with construction of its second line nearing completion. The President of Warsaw has announced the construction of a third line to start soon, with the project having gone through preliminary screenings. The line will connect the Warszawa Stadion station, which offers connections to buses, railway and the second metro line, with Gocław. The initial project will lead to the construction of six stations, with a total length of around 8 kilometres. The objective of building a third metro line in Warsaw is to connect its Eastern part to the city center and cut the journey time to around 17 minutes.

Project maturity

Construction of the third metro line in Warsaw was officially sanctioned in March of 2021 and is expected to begin constuction in 2023 and launch its 6 station line by 2028. Phase II and III of construction is not yet scheduled.

Estimated CAPEX

bEUR 2.98

Warszawa

Key project components

The project is divided into two phases of construction:

- Phase I – construction of the segment between Warszawa Stadion and Gocław;
- Phase II – expanding the existing third line to cross the Vistula river in the city centre and South, connecting Praga Południe with Mokotów, Ochota and Służew.
- Phase III – Extending the third line to connect it to Śródmieście and Ochota, finishing at Dworzec Zachodni.

The first phase of construction requires construction of a depot (Kozia Górka) and the purchase fof additional dedicated rolling stock. Initial traffic projections estimates show that up to 315 thousand daily commuters will be using the third metro line upon completion of phase I.

Comments

The contract for the construction of the line will be granted via a public tender and this type of procurement does not discriminate in any way against manufacturers from other countries (as long as they comply with relevant EU regulations). The current contractor for the Warsaw Underground is Gulermak from Turkey, however the contracor for the third line is yet to be chosen.

Selected Infrastructure projects | Transport

Rail Baltica

Description

Rail Baltica is a multi-national initiative to connect the Baltic States, Lithuania, Latvia and Estonia, to the Western European railway network with an electrified double track high-speed railway line. Renovation works on the Polish side are currently underway, with the new line's construction nearing completion on the segment connecting Warsaw with Białystok. Rail Baltica is expected to increase cargo as well as passenger transit between the countries (as it will bypass the timely and costly need of axle replacement on the Polish-Lithuanian border). Rail Baltica is a top priority project for the European Union.

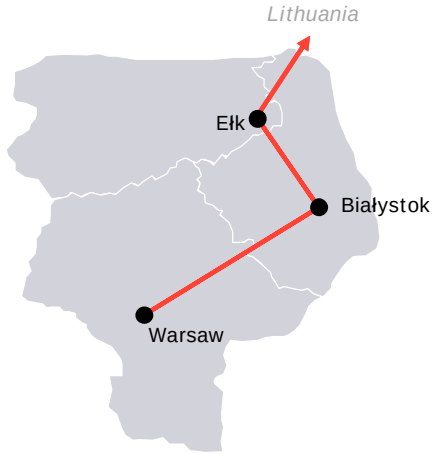
Project maturity

The71 km segment between Czyżew and Białystok is still under construction, and the remaining 194 km to the Lithuanian border are having their pre-design documentation prepared. Construction for the railway line connecting Warsaw with Tallinn was originally expected to finish in 2026, however due to regtulatory issues, the final segment, connecting Ełk to Trakiszki (the Lithuanian-Polish border), is planned for construction between 2024 and 2027. The project is mainly being financed through European Union funding.

Estimated CAPEX

bEUR 6.0*

*CAPEx for projects in Poland, Lithuania, Latvia and Estonia



Key project components

The renovated railway lines will be adapted to high-speed rail, allowing cargo trains to reach speeds of 120 km/h, with passenger trains reaching 249 km/h. The reduction in travel times will also allow for more connections between the cities and the project will modernize the connection between Warsaw and Białystok, cutting the journey time to under an hour and a half. The expected increase in cargo and passenger freight will also allow Poland to strengthen its position as a transit hub in Europe.

Comments

The project's implementer is chosen via a public tender and this type of procurement does not discriminate in any way against manufacturers from other countries (as long as they comply with relevant EU regulations). This technical dialogue allows for discussions with manufacturers to align their expectations with the market's capacity to deliver. Experience in the market is one of the main criteria for contractor selection.

Selected Infrastructure projects | Transport

Małaszewicze cargo terminal

Description

The dry port of Małaszewice lies on the most accessible route on the New Silk Road, connecting western and central Europe to Asia and Russia. The port is a critical junction, due to the difference in axle width between trains in Europe and Russia, 1435 mm and 1520 mm respectively. The Małaszewice port specializes in cargo transit, where goods are transferred to trains suited for European rail networks or onto trucks for further distribution. Due to the continuous increase in demand for land connections with Asia, the port's current throughput does not meet the required capacity. The logistics centre is planned to cover over 30 square kilometers and is to be the largest and most modern cargo transit hub in the region.

Project maturity

100% of the funding is to come from the EU and the National Treasury. Construction works are due to begin in 2023 with planned completion in 2028, with minimal obstructions to train freight during construction.

Estimated CAPEX

bEUR 0.88

Key project components

The expansion projects are expected to increase the throughput capacity of the port as well as build a modern logistics centre for the distribution of cargo in Europe. The expected increase in servicing from 15 to 55 trains per day, as well as being able to process larger and heavier trains (1050 meters from the original 750 m, and axle load increase from 22.5 to 25 tons) and an increase in speed to 40 km/h will greatly increase the port's transit capacity and strengthen the port's position as the main transit hub between Asia and Europe.

Comments

The project's implementer is chosen via a public tender and this type of procurement does not discriminate in any way against manufacturers from other countries (as long as they comply with relevant EU regulations). This project also offers the possibility for private investment into Logistics centres around the dry port.

Selected Infrastructure projects | Transport

Outer Port Gdynia

Description

The Port of Gdynia is a universal seaport located on the southern Baltic Sea in Poland.

The port specializes in handling general cargo, mainly unitised cargo, transported in containers and in ro-ro and bulk systems. The services are provided on the basis of an extensive network of multimodal connections, regular feeder and short sea shipping lines and ferry connections.

Maintaining a high growth rate of transhipment in Polish ports guarantees only strategic infrastructural investments. Implementation thereof also creates opportunities for the development of other forms of activity and more efficient handling of non-container cargo.

The Outer Port Construction Technical Concept considers the conditions and technical possibilities for the development of the Port in stages, however without clear indications as to the order and preferences of the final destination, which will be subject to consultation with stakeholders and the Private Partner, acting in this process independently or in a consortium.

Project maturity

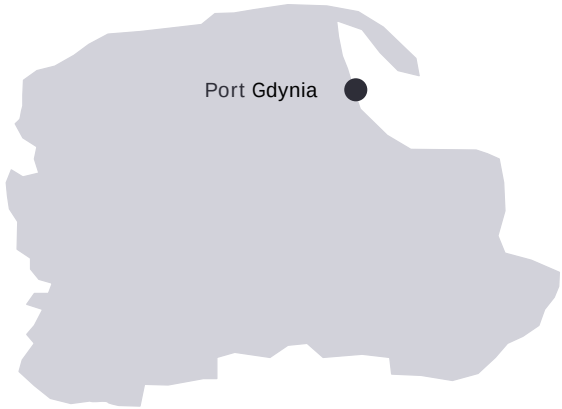
The project is being prepared for construction in PPP. Four participants were admitted to participate in direct PPP negotiations:

- Gdynia Terminal Holdings & Meridiam Infrastructure,
- Hutchison Ports
- International Container Terminal Services
- Mota-Engil Central Europe

The procedure, which will result in signing an agreement with the future contractor for the Gdynia Outer Port, is to be completed in 2022. Construction would be carried out in the period 2024-2026.

Estimated CAPEX

bEUR 0.7



Key project components

The investment will enable navigational safety and technologically efficient handling of, among other things, a 24,000 TEU container vessel with a total length of approximately 430 metres.

Following the conceptually established technical and technological solutions, the target infrastructure will allow to handle unitised transhipment at the level of 2.5 million TEU per year.

Comments

The Gdynia Outer Port has also been selected as possible location for the offshore installation port for the Baltic offshore wind farms, therefore it is potentially interesting project for foreign investors in the energy sector. However, the details of the project implementation scheme are not known.

Selected Infrastructure projects | Transport

Deepwater Container Terminal Świnoujście

Description

The Świnoujście port is part of a maritime highway linking southern Europe and Poland with the Swedish ports of Trelleborg and Ystad. The terminal, located in the outer port, will be able to handle the largest container ships that can enter the Baltic Sea. The infrastructure will support two large ocean-going vessels and several smaller, feeder vessels. The terminal is to be located in the Outer Port, east of the LNG Terminal's eastern breakwater.

The Deepwater Container Terminal will handle the largest vessels that can enter the Baltic Sea. It will enable the processing of 2 vessels with a length of 400 metres and one up to 200 metres at the same time.

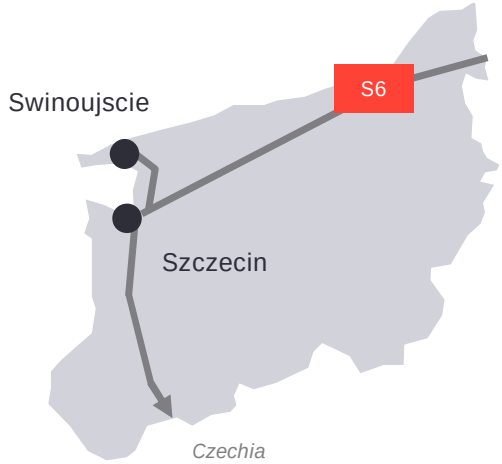
The annual handling capacity of the terminal will be two million TEU.

Project maturity

The project is being prepared for construction in PPP. Three participants were admitted to participate in the second stage of the tender for the selection of the contractor and terminal operator: the state-owned Agencja Rozwoju Przemysłu, the British company Baltic Gateway created, among others, by the persons responsible for the construction of the DCT Gdansk terminal, and Deme Concessions from Belgium. The procedure, which will result in signing an agreement with the future contractor for the deepwater container terminal in Świnoujście, is to be completed in 2022.

Estimated CAPEX

bEUR 1.1



Key project components

Apart from the construction of the terminal, a number of investments are planned on the land and sea side to increase its transport accessibility.

PKP Polskie Linie Kolejowe has invested PLN 1.5 billion in the railway network in both ports of Szczecin and Świnoujście. By mid-2022, they will have modernized nearly 100 km of track and almost 84 km of catenary, installed state-of-the-art control equipment, etc.

The Świnoujście-Szczecin waterway, which is being deepened to 12.5 metres, is of great importance for the network of connections and also for the greater integration of the port complex. The investment, which will cost over PLN 1.4 billion, will also be completed in 2022. In connection with the modernization of the waterway, the Port Authority is investing in improving the accessibility of the remaining port basins.

Comments

A PPP procedure is currently underway to select a private partner to carry out the investment. Under the terms of the construction of the terminal, it is envisaged that the property for its construction will be leased for a period not exceeding 30 years. The project may be interesting for foreign investors due to the demanding construction proces.

Selected Infrastructure projects | Transport

Seaport for offshore wind energy in Gdynia

Description

Development of offshore wind energy on the forecasted scale, i.e. 5.9 GW of installed capacity by 2030 and about 11 GW by 2040 will change the structure of electricity production in Poland. The projected share of electricity generation from offshore wind farms in 2030 will be up to 13.3%, while in 2040 even up to 19.3% of the total production.

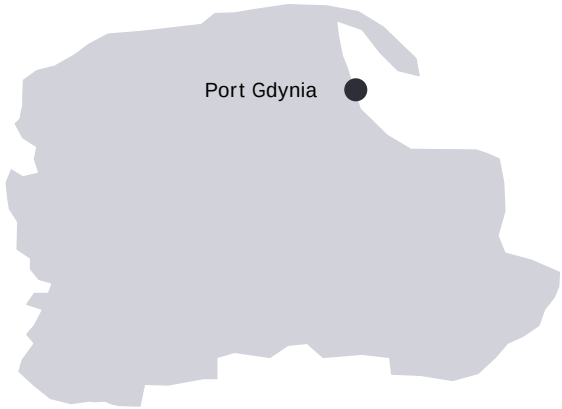
For the development of the offshore wind energy industry in Poland, the construction of a major installation terminal in the seaport of Gdynia is envisaged, intended to handle the supply chain of components necessary for this technology in Poland and providing logistic facilities for offshore wind energy on the Baltic Sea. The project will support the development of offshore wind energy including the creation of an appropriate offshore port facilities in Poland, both in terms of installation and maintenance of offshore wind farms.

Project maturity

The project has secured funding from the NRF. The project is planned to be implemented between 2022 and 2026.

Estimated CAPEX

bEUR 437



Key project components

In order to properly handle and ensure the safety of offshore wind farms, the investments include: the construction of a deepwater installation terminal in the Port of Gdynia, with an area of approximately 30 ha, which will enable the simultaneous handling of 2 installation units, and the reconstruction of ports on the central coast of the Baltic Sea and access to them from the sea (including breakwaters) to enable the use of service terminals intended for handling offshore wind service vessels.

Comments

A PPP procedure is currently underway to select a private partner to carry out the investment. The project may be interesting for foreign investors due to the demanding construction process.

Selected Infrastructure projects | Energy

Ostrołęka – Combined Cycle Gas Turbine plant

Description

Total value of installed capacity: 745MW

Project maturity

Unbuilt, planned to be functional in 2026. The company CCGT Ostrołęka sp. Z oo was established in January 2021, which will be responsible for the implementation of the investment.

Estimated CAPEX

3.4 bn PLN

Key project components

PKN Orlen would also like to implement the possibility of capturing carbon dioxide from the installation (50-70%, up to what can be done profitably)

PKN agreed to take gas deliveries from PGNiG through 2027, including to the Ostroleka plant.

Comments

According to the investment agreement, Energa and PKN Orlen will jointly hold a majority stake of 51 percent, and PGNiG will own the remaining 49 percent

Dolna Odra – two CCGT units

Description

Dolna Odra – two CCGT units

Unit CC 1: Gas-fired combined cycle with CHP, 717 MW (start-up in 2023)

Unit CC 2: Gas-fired combined cycle with CHP, 717 MW (start-up in 2023)

Being developed by PGE with a a GE-led consortium

Project maturity

The new power plant expansion has been awarded a 17-year contract in the main power market auction, which will begin in 2024.

In March of 2020 PGE placed a turbine order for the plant with GE

Estimated CAPEX

4.73bn PLN net.

Key project components

The GE- led consortium includes the Polish company Polimex Mostostal, which has been awarded the EPC contract (EPC) for the new units, together with full underground infrastructure. GE factories in Elblag and Wroclaw in Poland will also produce equipment for the project.

Comments

There is an additional 12-year service contract with GE

Selected Infrastructure projects | Energy

Gdańsk & Grudziądz Combined Cycle Gas Turbine plants

Description

Planned: Gdańsk – 0.6 GWe

Being developed by Joint investment of Lotos, Energa and Orlen

Value

1,42bn PLN

Project maturity

In March 2020, Energa announced that it was examining the possibility of building two gas and steam units in Grudziądz and Gdańsk with a capacity of 450-750 MWe. The company approached external entities interested in a strategic partnership or the purchase of special purpose vehicles implementing investments.

The construction is planned for July 2026.

Key project components

The combined cycle gas turbine (CCGT) unit in Gdańsk, powered by high-methane natural gas, will be designed and manufactured as a unit with a single gas turbine, a HRSG (heat recovery steam generator), a condensing steam turbine set and a wet fan cooling tower.

Comments

Main parameters of the project will soon be approved, such as: capacity, location, and Lotos's share in this joint venture with Orlen and Energa. The project qualified for funding from the National Reconstruction Plan, so it could obtain subsidies/a preferential loan of 25-50% of its value.

Description

Planned: Grudziadz – minimum 518 MW

Value

Up to 1.8bn PLN

Project maturity

PKN Orlen and Energa, a company from the Orlen group, have agreed to finance the construction of a gas and steam power plant in Grudziądz. In planning for 10 years, the investment is finally confirmed to be going ahead.

Key project components

To be determined.

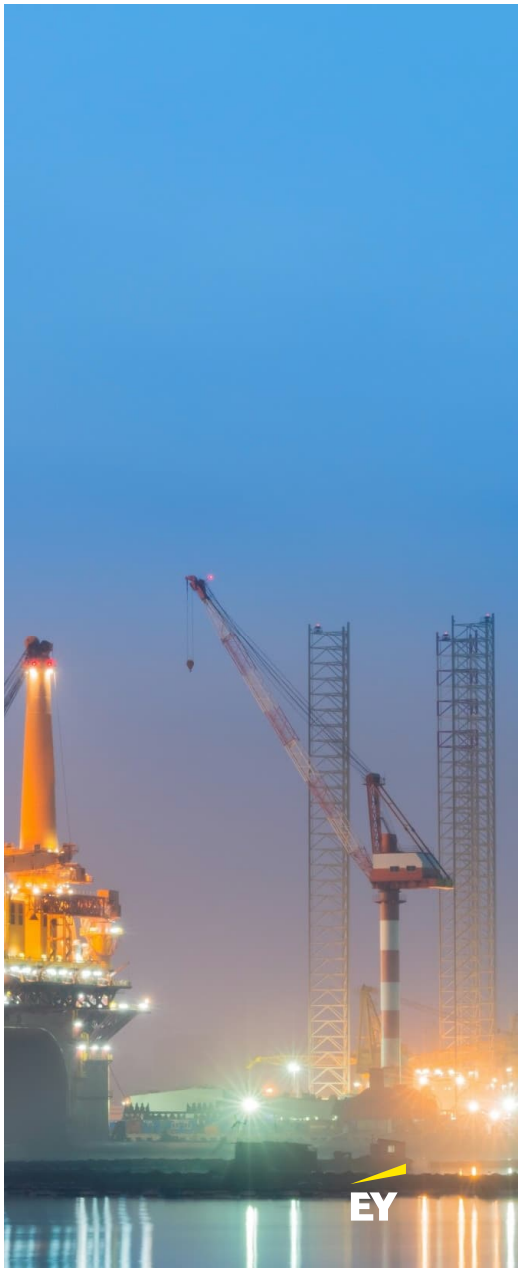
Comments

Grudziądz (capacity obligation approx. 518 MW) will be awarded a 17-year capacity contract (Dec 2021 data). The auction ended with a closing price in the range of 367.05-400.40 PLN / kW / year. This effectively guarantees significant future earnings.

Selected Infrastructure projects | Energy

Key issues of the sector / subsector

- Gas is being increasingly touted as an alternative to coal and a way of „transitioning" towards a green Energy future in Poland. The government is keen to support gas based projects in general.
- There is however some apprehension to do with this energy source in the medium term, as some worry that with renewable technologies improving, will soon be able to compete with gas Energy projects on efficiency and funding support, and as such render their long-term future uncertain.
- The development of gas energy is one of the important directions in the ORLEN2030 Strategy, and considering the size of this firm this gives an important perspective of the direction of this sector in Poland overall.
- Japanese involvement potential:
- Overall, the ministry of Climate supplies policy for this sector, but in effect the point of contact for further CCGT projects are individual Polish companies like PKN Orlen, PGNiG, or Enea, and cooperation would likely proceed in the EPC format. Japanese firms would be competitive in any tender that is announced by these companies.
- One potential avenue which has not yet been fully developed is the gassification of coal – though it is recognized that past projects like the Leczna Power Station (Enea) the floated the idea of using gassified coal never came to fruition, other projects involving this process would still be of interest to the Polish government.
- Japanese firms are of course already present on the Polish CCGT market, as Mitsubishi Hitachi Power Systems has participated in projects like the CCGT unit in Warsaw's Żerań district (put into operation this December), or the coal plant in Kozienice. Continued cooperation via the EPC formula is a likely recipe for success. Gas plants with the potential for future green gas supply like the Żeran plant are and will be well-suited to stringent European requirements in coming years



Selected Infrastructure projects | Energy

Planned Polish hydrogen-related projects

- The hydrogen strategy until 2030 with a perspective to 2040 exemplifies the seriousness of the Polish government in the area of hydrogen gas production and application
- Outside of the transport-related plans, which will be discussed elsewhere (fuelling stations, and hydrogen powered rail), energy-related plans will focused on hydrogen production, via PV-mediated electrolysis or dehydrogenation of propane
- Polish perspective: Major Polish power and heat producers have initiated significant investments planned for the following years, as there is a need to replace old coal-fired plants. The main focus is however placed on natural gas-fired capacities (including 1.4 GW in Dolna Odra, 1 GW in Ostrołęka, 0.5 GW in Żerań and several other projects) and renewable energy sources (including planned off-shore wind capacities).
- Therefore, hydrogen-based generation has not been perceived as the future of the Polish power sector, at least at present. On the other hand, it might be the case that planned gas capacitates would be at some point technologically modified in order to allow for partial combustion of hydrogen, as is being done at Vattenfall's Nuom Magnum power plant in Eemshaven in the Netherlands, where Mitsubishi Power is planning to convert a 440-MW combined cycle unit to run on 100% hydrogen

Selected Infrastructure projects | Energy

Polimery Police | Grupa Azoty

A factory producing propylene and polypropylene „Polimery Police" planned by 2022. Approximately 17 kt of hydrogen will be produced annually (via dehydrogenation) alongside this core process of dehydrogenation of propane to propylene, and it will be purified and used for the production of ammonia in Zakłady Chemiczne Police, reducing CO2 emissions by around 100 kt per year compared to current production The total estimated budget for the implementation of the project is approximately EUR 1.5 billion, of which approximately EUR 1.2 billion will be capital expenditure (contractor's remuneration, license purchases, preparatory work, capitalized salary costs).

InGrid

InGrid – Power to Gas – a development planned to be completed by 2022 of a new installation in the company's branch in Odolanów in which green hydrogen will be produced with the use of electricity generated by photovoltaic panels (which will be injected into a separate gas network. The aim of the project is to build a demonstration installation for the production of green hydrogen in the electrolysis process and to acquire knowledge about the possibility of injecting hydrogen into the existing gas networks, determining the proportion of the natural gas-hydrogen mixture and its impact on pipelines and terminal equipment. This installation will be able to work on an island supported by an energy storage, as well as to produce hydrogen with the use of energy from the power grid.

Description

- Although the share of renewable energy sources sharply increased in recent years, in 2019 they accounted for only 11% of electricity and 9.5% of heat produced in Poland. Currently, hydrogen is not used in the Polish energy sector, excluding R&D projects.
- The increasing regulatory pressure on decarbonization of natural gas may result in specific regulations allowing for blending hydrogen with methane being introduced at some point, and even a low obligatory share of hydrogen in the mix would translate into considerable demand for this energy carrier.

Japanese involvement potential:

- Polish companies would no doubt welcome Japanese expertise in hydrogen production in local projects. Cooperation along the lines of the Green Hydrogen Hub in Hamburg, which has Mitsubishi Heavy Industries as a partner to build a 100MW scalable electrolyser at the site of a current gas power plant (though a coal plant would be more likely in Poland), could happen in Poland as well. That project was also shortlisted to receive support from the EU program 'Important Projects of Common European Interest' (IPCEI), to which Polish ministries encouraged applications for in the past.
- PKN Orlen, for example, started tender procedures for the construction of the first Polish hydrogen refueling stations located in Poznań and Katowice in mid-to-late 2021. The management board of operations for PKN Orlen has even specifically stated that „cooperation within the Masovian Hydrogen Valley with partners who already have experience in using it as a source of renewable energy will be valuable to us". The activities of the Valley will enable investment and implementation works, as well as research and development works, which PKN hopes to use as a springboard for other hydrogen projects.
- The hydrogen sector is in its infancy in Poland, but clear funding opportunities and an exponential increase in interest mean that any sort of Japanese expertise or partnership would be in high demand, whether that would be related to its generation, transportation, or usage.

Selected Infrastructure projects | Energy

Hydrogen production hubs | PKN Orlen

- PKN Orlen states that it wants to build hydrogen-based transport infrastructure and ecosystem regardless of the stage of RES development in Poland and without waiting for surplus renewable energy and is therefore conducting several R&D projects & investments related to hydrogen:
- Hydrogen production hubs – PKN Orlen is already conducting investments that will enable the supply of high purity hydrogen in three so-called hubs in Poland:
  - Kujawy HUB (located in Anwil's plant in Włocławek) –
  - Mazowsze HUB ((located in refinery in Płock)
  - Silesia HUB (located in biorefinery in Trzebinia)
- It is also planning Green H2 R&D projects – PKN Orlen already conducted a scouting study and will be conducting a feasibility study for the green H2 production facility (PV farm + electrolyser) in Litvinov in the Czech Republic.

Selected Infrastructure projects | Energy

Hydrogen production hubs

Kujawy HUB (located in Anwil's plant in Włocławek) – the installation will ultimately will be able to produce up to 600 kg of hydrogen per hour (170kg/h initially). Hydrogen produced in brine electrolysis process as a by-product of the chlorine extraction process will be purified to the 99.999% purity and offered as transport fuel. The investment includes development of logistics infrastructure and refuelling stations, & should be ready in 2022. Ultimately, the hub will be producing green hydrogen. PKN Orlen is carrying out this investment of ~100m PLN

Mazowsze HUB (located in refinery in Płock) - a similar investment to the one in Włocławek should be ready by the end of 2023, however no additional details have been published. Ultimately, the hub will be producing blue hydrogen.

Silesia HUB (located in biorefinery in Trzebinia) – the production of high purity hydrogen should start by the end of 2021, when the new installation for the production of green glycol will be ready. About 25% of 16 millions Nm3 of hydrogen produced per year will be purified and offered as a fuel for transportation needs. Ultimately, the hub will be producing green hydrogen.

Green H2 production facility

PKN Orlen is planning a pilotage project in its refinery in Płock for a PV farm and electrolyser along the lines of the feasibility study they conducted for the green H2 production facility (PV farm + electrolyser) in Litvinov in the Czech Republic

Description

- In the case of the Kujawy hub, the company has already signed letters of intent on cooperation for the development of hydrogen-powered public transport with the Górnośląsko-Zagłębie Metropolis, Krakow Municipal Holding and Miejskie Przedsiębiorstwo Komunikacyjne in Krakow and the City of Płock
- As part of the National Reconstruction Plan, funds allocated to projects contributing to the development of hydrogen technologies overall will reach EUR 800 million. The implementation of projects in this field will also be possible thanks to public aid under the European Commission mechanism called Important Projects of Common European Interest.
- The construction of the Polish hydrogen economy is to be based on the creation of hydrogen valleys, which, in accordance with the EU Hydrogen Strategy, are to become a coherent element of the European Hydrogen Ecosystem. The Polish Hydrogen Valleys Innovation Ecosystem will include innovative industrial undertakings, large-scale, long-term investment projects implemented in specific areas.

Japanese involvement potential:

- Poland exported ~246,000 tons of hydrogen in 2020 – in the top ten worldwide and ahead of China. In the Polish Hydrogen Strategy document, the supply of finished products for the hydrogen economy to the market for use by domestic and foreign entities is listed as a specific goal. There is thus also room for hydrogen sales to Japan if interested, given the specialist shipping technology currently being piloted by Japan.

Selected Infrastructure projects | Energy

Pollution mitigation

Description

At the end of September 2021, the Górażdże Group, owned by HeidelbergCement, announced that it would take part in the EU-funded ACCSESS research project. 18 industrial partners and research organizations participate in it, and the coordinator is the Norwegian company Sintef Energi.

Value

EUR 18 million (with EUR 15 million from the EU Horizon 2020 program).

Project maturity

Start: May 2021

End: April 2025.

Key project components

In the cement plant located near Opole, a pilot installation for capturing CO_2 from flue gases after the combustion process will be implemented. This will be the first project of this type to be implemented in the country. It also provides for the creation of a legal and organizational framework for an efficient CO_2 transport system from continental Europe to the North Sea landfills - created after oil and gas extraction.

Comments

Alongside such carbon capture projects, it will also be necessary to create a trans-European system of CO_2 transport, which will allow it to be transported to the place of storage. As for potential Japanese investment, Japan is exploring projects in this area and its shipping companies like Mitsui O.S.K. Lines (MOL) and Kawasaki Kisen Kaisha (K Line), are involved in a research project focusing on developing carbon capture and marine transportation technologies. K Line in particular has said that it will use its expertise in managing LNG carriers to break into liquid CO_2 transport. As such, cooperation in the transport aspects of this technology could be a fruitful prospect

Selected Infrastructure projects | Energy

Pollution mitigation

Description

Enea announced that Łęczyńska Energetyka (a subsidiary of the Bogdanka mine) will conduct a pilot of the Norwegian company CaptiCO2's technology.

Value

tbd

Project maturity

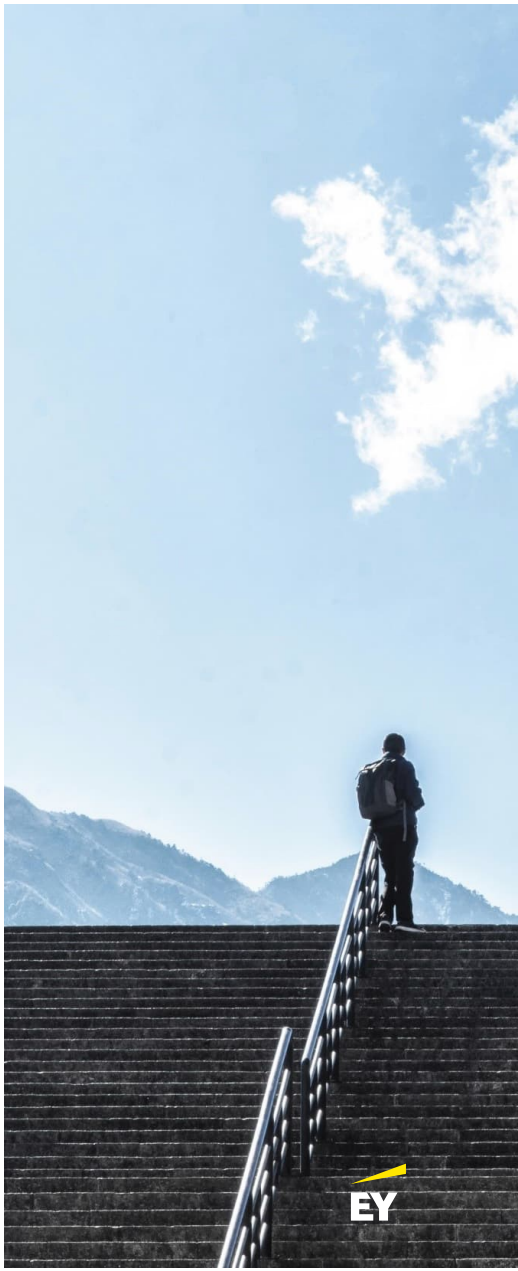
Planning phase – further cooperation being discussed

Key project components

The main assumption of the agreement and the pilot project is the development of a technology limiting CO_2 emissions to the atmosphere and confirmation of the technology maturity level at the TRL 7 level, i.e. a prototype test under operating conditions.

Comments

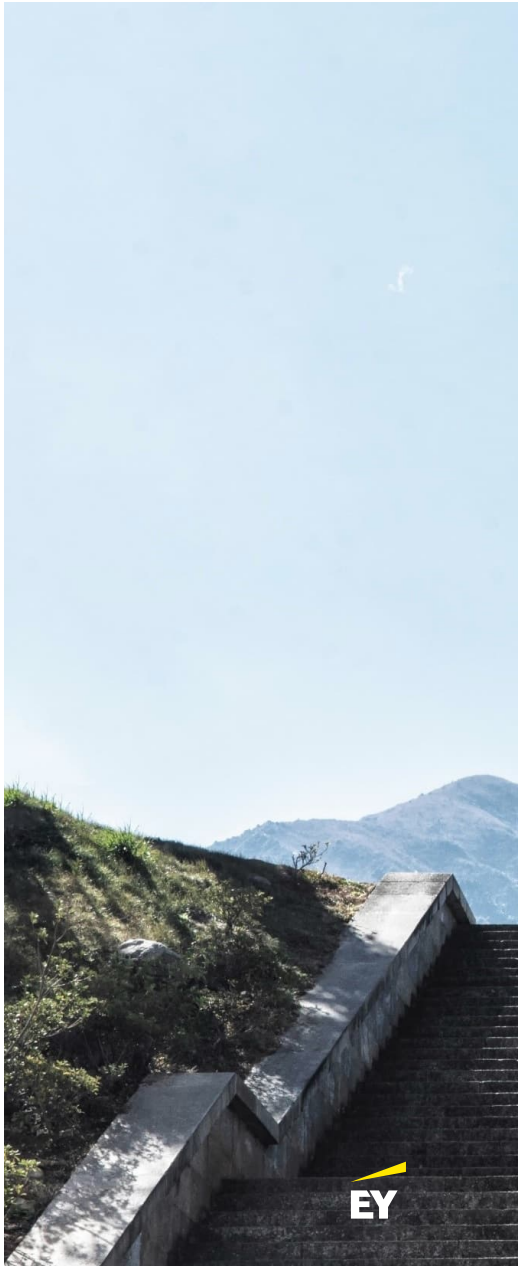
CaptiCO2's solution is based on the cryogenic capture and encapsulation of CO_2 in a stable chemical compound. The technology is characterized by high efficiency of carbon dioxide capture, and the substance produced in the process can be transported and stored without any problems



Selected Infrastructure projects | Energy

Key issues of the sector / subsector

- Polish air quality is one of the worst in Europe, largely due to the prevalence of coal in the country and especially the domestic use of coal-fired stoves for heating.
- Consequently, the government has put out a National Air Protection Programme, setting out a strategy until 2025 with perspectives to 2030 and 2040
- It includes:
  - The development of a better air quality assessment system,
  - Reduction of emissions of air pollutants from the household and communal sector,
  - Reduction of emissions of air pollutants from the road transport sector,
  - Development of renewable energy sources,
- And ensuring financing of projects aimed at improvement of air quality. (No specific quantities given)
- State-owned companies are also thinking about capturing CO_2. PKN Orlen talks about the CCU technology as a key factor in the decarbonisation strategy of the concern, and Lotos, at the beginning of November 2021 - together with its subsidiary Lotos Petrobaltic and Grupa Azoty – presented to the Ministry of Climate their "Green Paper for the Development of CCS in Poland". It contains a set of recommendations for legislative changes aimed at enabling the launch of large-scale commercial underground carbon dioxide storage projects in Poland.
- The growing interest in CO_2 capture technologies can also count on support from EU funds. An example are the projects that won the recently concluded first call for applications to the Innovation Fund, like The French K6 project at the Lumbres cement plant, or the BECCS @ STHLM (Bio-Energy Carbon Capture and Storage) installation for capturing and storing carbon dioxide with heat recovery that will be built a the heat and power plant in Stockholm



Selected Infrastructure projects | Energy

Offshore Wind

Description

Offshore wind presents a great business opportunity in Poland.

Offshore wind permits have been separated into two waves. The first is about 5,9GW. There are five investor partnerships involved. Ocean Wind is a JV, which is NG, a French firm, plus EDPR (a Portuguese firm).

The second wave is about 10GW in size and will revolve around 11 locations where turbines can be built – the Polish government is taking applications from potential investors for the 11 sites already selected.

The main players are expected to be: the five partnerships involved in the first wave, large European energy companies outside of Poland, and large infrastructure funds.

Onshore wind comments

Onshore wind presents a number of difficulties, as the requirements for where they can be built are very restrictive, and only a few % of the total land area in the country could fit these requirements. The only benefit/support for these projects is that of the capacity market. The 10H constraint from 2016, meant wind turbines cannot be located even in industrial and environmentally degraded areas. The continued uncertainty about this rule has only recently begun to improve, with the new management of the ministry for windmills announcing the project will be reviewed in Parliament (suggesting possible changes in 2022). As long as the 10H rule is not revised, developers will not be able to prepare a new pool of investments.

Technology

These offshore projects often have hydrogen-related components (e.g. they plan to produce green hydrogen when they have excess energy)

Project maturity

Projects like Baltica 2 and 3 aim to start delivering electricity by 2027 and 2026 respectively, and they received the technical conditions for connection to the transmission grid in 2020/2019. The auctions for the next wave of projects will be in 2025 and 2027, and it takes around five years to prepare the relevant documentation for these

Selected Infrastructure projects | Energy

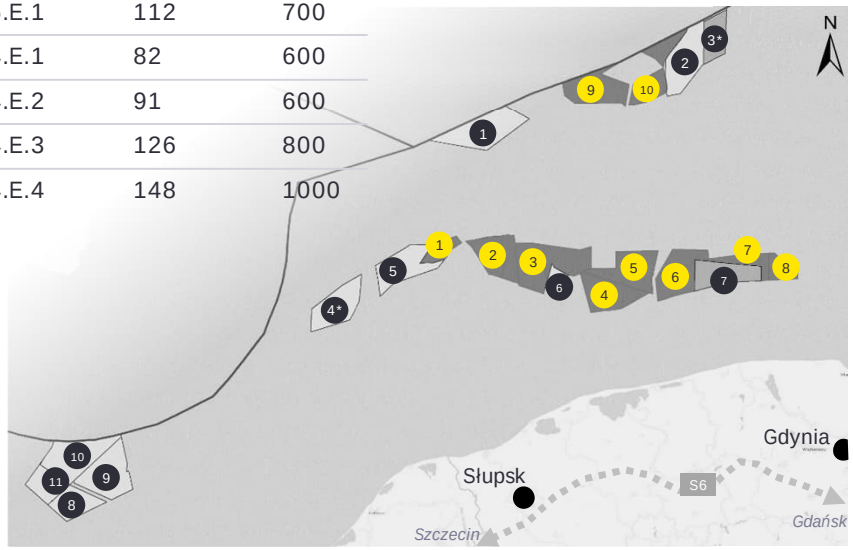
OWF projects - 1st round of development in Poland

	Project	Cap. [MW]	Deweloper	Partner	CfD* support
1	FEW Baltic II	350	RWE	-	✓
2	Baltyk II	720	POLENERGIA	Equinor/Brookfield	✓
3	Baltica 2	1 498	PGE	Orsted	✓
4	Baltyk III	720	POLENERGIA	Equinor/Brookfield	✓
5	Baltica 3	1 045	PGE	Orsted	✓
6	Baltic Power	1 200	PKN ORLEN	Northland Power	✓
7	C Wind	200	OCEAN WIND	-	✓
8	B Wind	200	OCEAN WIND	-	✓
9	Baltyk 1	1 560	POLENERGIA	Equinor/Brookfield	✘
10	Baltica 1	900	PGE	TBC	✘

2nd round of development in Poland

	Locations	Area [km²]	[MW]
1	53.E.1	150	1 200
2	60.E.3	143	1 100
3*	60.E.4	77	600
4*	43.E.1	118	900
5	44.E.1	121	800
6	45.E.1	17	100
7	46.E.1	112	700
8	14.E.1	82	600
9	14.E.2	91	600
10	14.E.3	126	800
11	14.E.4	148	1000

Locations for OWF projects in Poland



Selected Infrastructure projects | Energy

Potential for Japanese support

Most of these projects, due to high demand, do not need funding support. Japanese assistance in these undertakings is however very possible – it would likely be in the form of logistical/ strategic or technological support e.g. ships and know-how in building foundations that these turbines stand upon. The longer-term servicing of these structures could also be an area for cooperation.

To take a specific example, PGE and Ørsted started a tender for the preparation of a Construction Project together with obtaining a building permit for two stages of the Baltica Offshore Wind Farm in January 2022 (with the deadline being at the end of the month).

The subject of the contract includes, amongst others:

- the preparation of draft building permits in accordance with the Construction Law,
- consisting of a land development design, architectural and construction design,
- technical design, as well as the required opinions, contracts, expert opinions and certain (but not all) permits.

The order includes elements such as offshore power stations, offshore wind farms (each consisting of a nacelle with a generator, rotor, tower, connecting section and foundation) and internal power and telecommunication lines. While it would be too late to prepare for this tender, there would be others in the future for the remaining offshore farms, which Japanese investors could compete for.

Selected Infrastructure projects | Energy

Regulations

The investment process of offshore wind farms is long and requires large financial outlays, because apart from the costs of equipment, the investor incurs significant costs of project preparation. One of the most important things for an investor to know before committing an investment is precisely this regulatory approval process

Overall, the initial stage of an investment into offshore wind farms takes around 5 years, and can be broken down into the following steps:

- Acquisition of PSZW
- Environmental studies, Environmental Impact Report, Construction Permit
- Geological surveys
- Wind measurements
- Design, FEED
- Preparation for supplier contracting
- Preparation for auction for contract for difference,
- Participation in auction
- Acquisition of financing

One of the first and necessary permits obtained in the investment process is a permit for the construction or use of artificial islands, structures and devices in Polish sea areas (the aforementioned "PSZW"). It should be emphasized that this is not a permit authorizing the implementation of the investment, and at the same time it is necessary to obtain a separate location permit for cables transmitting electricity generated in an offshore wind farm to the power grid on land. If an exclusive economic zone spatial development plan has been adopted, the PSZW permit is issued by means of a decision by the minister responsible for maritime economy. If, however, such a plan has not been adopted, the decision is issued by the territorially competent director of the maritime office

The application for the issuance of the PSZW should specify the detailed description of the project requiring the permit and its purpose, along with the proposed location, the area of the body of water and the period necessary for the implementation and operation of the project. It should be remembered that each change of the geographic coordinates indicated in the application initiates a new authorization procedure. The application also provides the characteristic technical parameters and values of the planned project, including the presentation of stages and the schedule for the implementation of the project and an assessment of economic, social and environmental impacts.

However, the application does not present the specific location of the connection infrastructure, as it is only possible after obtaining the connection conditions and seabed surveys. In this regard, only the proposed variants of the submarine cable route and the concept of energy input into the network should be presented. Laying and maintaining cables in the exclusive economic zone requires agreeing their location and maintenance methods with the minister responsible for maritime economy. In the context of technical parameters, the characteristics of a given investment should be presented, such as number of planned turbines, their maximum and minimum power. The environmental impact assessment is a particularly important element of the application. It should be noted that for the onshore part it will be necessary to obtain separate location permits.

Selected Infrastructure projects | Telecommunications & IT

Providing access to very fast internet

Description

The reform will facilitate investments in 5G networks and the implementation of solutions using 5G connectivity in society and economy. The reform is aimed in particular at the elimination of the existing barriers to the implementation of the 5G network in vertical industries, the adaptation of national legislation (amendment of regulations affecting the development of mobile networks) to the recommendations resulting from the so-called connectivity toolbox.

As part of the investment, it is planned to provide operators with funds in the form of returnable or partially returnable financing, which will fill the gap related to obtaining financing for commercial investments by operators, in order to accelerate and scale up these investments. The aim is also to raise the level of public awareness of the emission levels of electromagnetic fields by financing the construction of a stationary EMF emission monitoring system.

Project maturity

Regulatory component
Q II 2021 – Q IV 2023
In progress – initial phase

Infrastructural component (selected)
Q II 2022 – Q III 2026
Ongoing

Selected Infrastructure projects | Telecommunications & IT

Providing access to very fast internet

Key project components

Infrastructural component (selected)

- Development of wireless networks by supporting the implementation of the 5G network in Poland
- Construction of a stationary electromagnetic field monitoring system. As part of the system, 300 installations for stationary monitoring of the emission of electromagnetic fields emitted from radio communication installations will be built. The system will cover 50 cities in Poland. This action aims to support the implementation of the 5G network through effective information citizens with real levels of electromagnetic fields from radiocommunication installations, which in turn will contribute to increasing social acceptance for this type investment. The data from the system will supply the central database on the emission levels of electromagnetic fields, i.e. the Information System on Installations generating Radiation Electromagnetic

Regulatory changes enabling the implementation of the 5G network in Poland in an economically effective and timely manner, thus developing and increasing the investment potential of the areas (selected):

- Logistics and transport - including: introducing sector regulations for the use of drones and enabling the use of the 5G network in this area, enabling the approval of autonomous vehicles and developing conditions for their use in road traffic
- Agriculture - incl. monitoring of animals and the ongoing analysis of their health and activity, along with automatic dosing of drugs and fodder, autonomous systems for the entire production and harvest cycle with the use of autonomous agricultural machines and drones
- Smart cities - including: comprehensive regulation of the principles of operation of local government units in the field of smart cities, securing the rights and interests of natural persons in connection with the processing of huge amounts of personal data, clarifying the liability of public entities for damage caused by infrastructure and malfunctioning of the infrastructure
- .

Comments

- Support will be provided primarily in the form of instruments repayable or partially repayable financial instruments (e.g. a loan with a partial redemption). The possibility of financing activities in the form of non-returnable co-financing is not excluded - this type of financing is envisaged, inter alia, for the construction of a stationary EMF emission monitoring system
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja (leader)
- The entities participating in the implementation of the investment are: Bank Gospodarstwa Krajowego (BGK), Polish Development Fund (PFR), Centrum Projektów Polska Cyfrowa (CPPC), Office of Electronic Communications (UKE), Institute of Communications - National Research Institute and MFiPR
- The support will be directed to telecommunications entrepreneurs, both from the SME sector and large enterprises, as well as to state research institutes and central offices of government administration bodies
- Target population: households, institutions of socio-economic importance, entities from vertical industries, research units and enterprises providing 5G services

Potential areas of investment / cooperation

Fiber optic cables, ducts, cabinets, connectors, raw materials for their production, earthworks, installations / construction of electromagnetic field emissions continuous monitoring points, drones infrastructure, autonomous machines and systems, smart cities solutions

Selected Infrastructure projects | Telecommunications & IT

Providing universal access to high-speed Internet – development of network infrastructure

Description

A series of investments related to the expansion of the broadband network with very high capacity, improving its efficiency and accessibility to distribution points in multi-family buildings, homes and places of public and business services, which will contribute to ensuring universal coverage of advanced wireless connectivity, including 5G networks, management and monitoring systems.

Project maturity

Q IV 2021 – Q III 2026

In progress – initial phase

Key project components

- Construction of broadband networks providing access to very fast internet in the areas of white spots
- The implementation of the investment will involve an additional 931 thousand households (residential premises), which will be covered by broadband Internet access with a capacity of at least 100 Mb/s, with the possibility of its modernization to speeds measured in Gb/s
- In addition to households, the range of supported investments will also include, inter alia, public institutions or places of business activity - the support will contribute to the exhaustive coverage of particular localities with modern telecommunications infrastructure in which investments will be implemented, so that all potential users in these localities have the possibility of using high-speed internet

Comments

- Support under the intervention will be provided in the form of a non-returnable grant. Projects will be selected for funding in a competition mode
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja (leader)
- The entities participating in the implementation of the investment are: Centrum Projektów Polska Cyfrowa, Office of Communications Elektroniczna and MFiPR
- Direct support will be directed to: entrepreneurs telecommunications, both from the SME sector and large entrepreneurs
- Target population: households, institutions of socio-economic importance, public institutions, entrepreneurs operating in the areas of intervention

Potential areas of investment / cooperation

- Fiber optic cables, ducts, cabinets, connectors, raw materials for their production, earthworks

Estimated CAPEX

1 200m EUR

Selected Infrastructure projects | Telecommunications & IT

Equalizing the level of equipping schools with portable multimedia devices

Description

The aim of the investment is to support the digitization of the education process by equalizing the level of equipping schools with modern multimedia equipment for individual use (laptops, etc.), made available to teachers and students for their ongoing educational work. The software delivered with the hardware will enable interactive collaboration between teachers and students in real time.

Project maturity

Q III 2021 – Q II 2026

In progress – initial phase

Key project components

- Improving the equipment of schools and global institutions, providing teachers and students with access to portable multimedia equipment (laptops, tablets) along with software on an equal level in each school, so as to ensure equal educational opportunities for all students
- The orders and deliveries of equipment are planned to be spread over time until 2025
- Number of notebook computers planned to be delivered to schools - 950,000

Comments

- Support under the intervention will be granted in the form of non-returnable co-financing or direct financing of activities of institutions participating in the implementation of the investment. There will be no competition or indicative projects. Hardware investments will be carried out as central purchases of hardware and software (e.g. central purchases of hardware, operated by government administration units) or in the grant system (providing funds for individual purchases to individual bodies managing educational institutions)
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja (leader)
- The entities participating in the implementation of the investment are: MEiN, CPPC and NASK-PIB
- The implemented activities will be nationwide, and the beneficiaries will be school management bodies or directly heads of schools and educational institutions.
- Target population: students and teachers of primary and secondary schools

Potential areas of investment / cooperation

- Notebook computers

Selected Infrastructure projects | Telecommunications & IT

Development of the digital environment of preschool education and general education

Description

The aim of the investment is to support the bodies running kindergartens, schools and educational institutions in financing their individual investment needs in the development of the digital environment of their operations. An additional goal is the digitization of the system for conducting external examinations, in particular in the field of diagnostic tests, examinations related to examinations and selected examinations, in particular checking knowledge and professional skills.

Project maturity

Q II 2022 – Q II 2026

Ongoing

Key project components

- Implementation of activities ensuring access to the authorities running the education system units to finance their investment needs in the scope of further development of equipment with ICT solutions for education. Financing will be available nationwide and will cover over 30,000. units of the education system, including pre-school education units
- The investment needs in the area of digitization of schools and educational institutions are an inestimable value - the assumption of the investment is to provide the authorities running kindergartens, schools and educational institutions with financing that responds to their autonomous decisions in terms of increasing the quality of the digital environment of the units. Nevertheless, within the assumed budget, it is possible to achieve examples of quantitative effects:
  - Purchase of up to 1,220 million laptops
  - Equipping each classroom in educational units with an individual, modern connection internet and funding about 16 thousand educational buildings with an average of 7 classrooms
  - Equipping classrooms with 328,032 sets for teachers to conduct remote lessons
  - Equipping 12,030 kindergartens with interactive boards and monitors

Comments

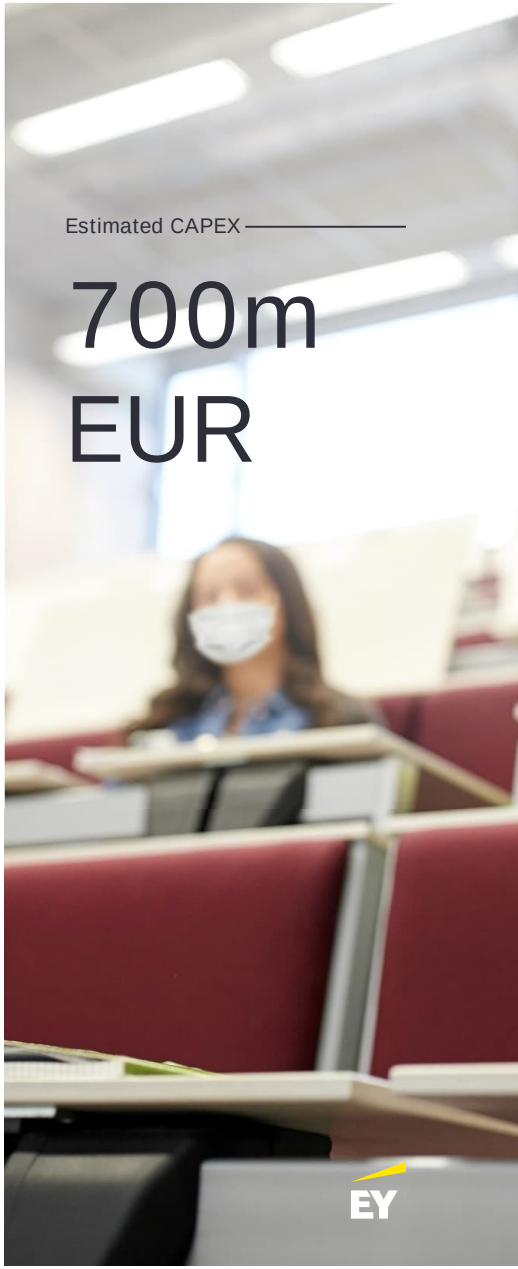
- The investment will be financed from the loan budget, however, the basic form of support will be non-returnable support - as the final recipients of support will be public entities of the pre-school and general education system
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja (leader). The entities participating in the implementation of the investment are: BGK, PFR, MEiN, CPPC, BGK and NASK-PIB
- Target population: bodies running kindergartens, schools and educational institutions; Central Examination Commission, district examination commissions

Potential areas of investment / cooperation

- Laptops, sets to conduct remote lessons, interactive boards and monitors

Estimated CAPEX

700m EUR



Selected Infrastructure projects | Telecommunications & IT

Broader use of digital technologies in public administration

Description

Improving the operation of the public sector, including public administration, through the wider use of digital technologies, especially in contacts between institutions and citizens, resulting in a more flexible relationship between the administration, businesses and society. Achieving the effects will also be strengthened by the use of breakthrough technologies, such as: artificial intelligence (AI), blockchain or internet of things (IoT).

Project maturity

Q I 2020 – Q III 2026

In progress – initial phase

Key project components

- Ensuring the continuity in operations of key computing centers, constituting critical infrastructure of the State, standardization of infrastructure services ensuring speed and security of implementation and maintenance of information systems using the most modern technologies that ensure the continuity of operation of digital products and services and efficient disaster or disaster recovery.
- Development of computing power resources of public institutions ensuring the minimum necessary level of security for the implementation of basic services
- Increasing the number of possible cases to be arranged electronically using e-services and processes digital and assurance model support system by breakthrough applications technology
- As part of investments in breakthrough technologies (blockchain, Internet of Things IoT, artificial Intelligence), the implementation of cooperation mechanisms that take into account the possibility of conducting tests and experiments by engaging the unit to co-create solutions with local governments, local entrepreneurs / start-ups, scientific circles and citizens

Comments

- For investments in the digitization of public services, digitization of internal public administration processes and building or expanding public IT systems and sharing platforms data and services, as a rule, state aid does not apply, as these tasks are carried out for public purposes and are not associated with obtaining an economic benefit. Breakthrough technology projects may include state aid components. SMEs will be able to apply for investment aid (advisory services, cooperation within cross-border projects)
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja. The entities participating in the implementation of the investment are: MRPiT in cooperation with GUNB, MRiRW, MF and CPPC
- Target population: public administration units, including local government units, the central unit government administration, units of government of combined administration, other institutions performing public tasks, universities, investors, enterprises, social organizations, KAS customers and its employees, farmers

Potential areas of investment / cooperation

- Solutions based on artificial intelligence (AI), Internet of Things (IoT), 5G, blockchain, services cloud, data opening and sharing access to data, robotics
- Autonomous vehicles, drones, high power computers (HPC), quantum technologies

Selected Infrastructure projects | Telecommunications & IT

Increased security in cyberspace

Description

Strengthening the cyber resilience of information systems (IT and OT) used in entities included in the national structure cybersecurity system, as well as providing highly efficient, energy-efficient computing centers along with securing the business continuity of the critical infrastructure securing data for the purpose of providing public services. Digitizing the system of early warning and alerting on the base PSP and TSO units. Equipping public services responsible for security with an independent one mobile infrastructure. Providing reliable remote access to databases for Police officers.

Project maturity

Q III 2021 – Q III 2026

In progress – initial phase

Key project components

Cybersecurity (CyberPL program)

- Increasing the effectiveness of the national cybersecurity system - its aim is, inter alia, obtaining expanded situational awareness and systemic operational support in responding to incidents
- Construction and development of operational cybersecurity centers (SOC): regional, sector and industry – with an emphasis on the development of capabilities, technical and organizational capabilities related to the prevention and response to security incidents through the creation and operation of specialized operational security centers

Infrastructure data processing

- Providing highly efficient, energy-efficient and scalable critical and data processing infrastructure. It will be implemented through an investment project for the construction of 3 standardized and energy-efficient data processing centers and the support of digital service-oriented solutions.

Optimization of the infrastructure of state services responsible for security

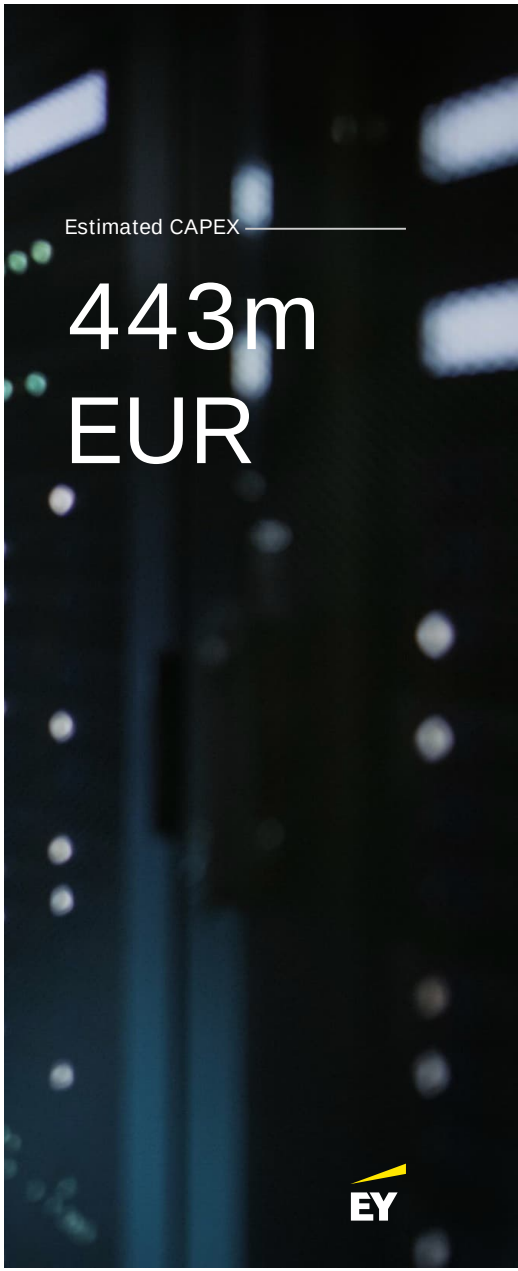
- Digitization of the early warning and alert system based on PSP and TSO units, which will translate into standardistaion throughout the country, and will also increase reliability and efficiency
- Equipping public services responsible for security with an independent mobile infrastructure, which will translate into the ability to flexibly respond in crisis situations for the purpose of providing assistance to the population at risk and the possibility of carrying out activities in non-urbanized areas (in Poland and abroad)
- Providing Police officers with reliable remote access to databases, the Police will obtain the ability to work with the use of the latest solutions.

Comments

- In the implementation of the cybersecurity component (CyberPL program), various methods of investment implementation will be used, including: tender competition, grant program, individual (indicative) project, depending on the type of planned intervention.
  - In the case of investments in data processing centers, an indicative list of projects is foreseen due to the significant interest in state security (this applies to critical infrastructure).
  - In the case of the component concerning the optimization of the infrastructure of state services responsible for security, an indicative list of projects is foreseen, due to the significant interest in the state's security (crisis management, including critical infrastructure)
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja (leader). The entities participating in the implementation of the investment are: Ministry of Interior and Administration, Ministry of Culture and National Heritage, and CPPC
- Target population: public administration, key service operators, digital service providers, enterprises, state services responsible for security, Polish citizens and foreigners residing in Poland, people crossing the Polish border - the internal border of the EU

Potential areas of investment / cooperation

- Construction and equipment of security centers, data processing centers, digitization of facilities and mobile infrastructure in the crisis management system, mobile terminals for police officers



Selected Infrastructure projects | Telecommunications & IT

Increasing the use of satellite data for the needs economy and the state

Description

The aim is to significantly increase the effectiveness of the use of satellite Earth observation in Poland, with particular emphasis on public sector entities. The project will enable an increase in the use of satellite data for the needs of the state and the economy, improving the country's management capabilities (decisions based on more specific and up-to-date information). The investment will result in a significant digital transformation of administration, demand for products related to Earth observation, new jobs for highly qualified staff.

Project maturity

Q III 2021 – Q II 2026

In progress – initial phase

Key project components

Construction of the National Terrestrial Segment

- Analysis of the needs in the field of IT infrastructure (data volume, use, computing power, piloting of monitoring services, development of services, integration and expansion of IT infrastructure, integration with other data sources, etc.)
- Building a national system of monitoring services, products, analytical tools and services along with the necessary infrastructure

Satellite Earth Observation System

- Building satellite capabilities for acquiring Earth images for the needs of state security and defense and to meet the needs of public administration. As part of the task, a satellite system consisting of two basic components will be designed, built and operational:
  - Space segment – which will include micro-class satellite platforms and sensors enabling the acquisition of optoelectronic and radar image data, equipped with, among others, a compression module and encrypted uplink / downlink radio links,
  - Ground segment – which will include the platform command and control station as well as user stations enabling the assignment of sensors and data Reception
- Launch of the first satellite along with the launch of the terrestrial segment - achieving initial operational readiness
- Launching more satellites from the constellation

Building the Space Safety System

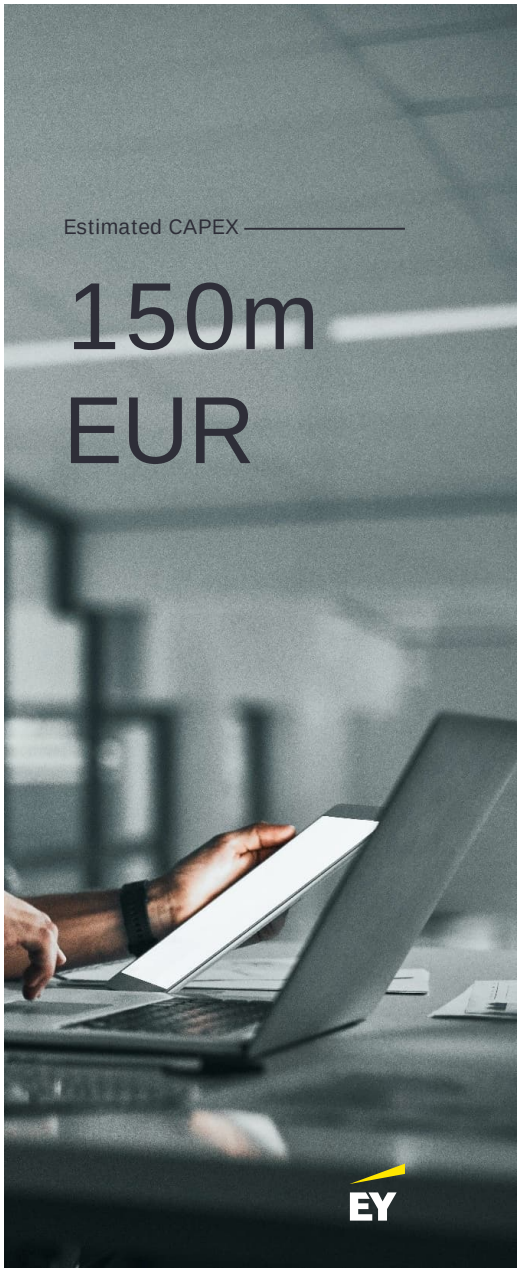
Support for other key space technologies

Comments

- Support will be provided primarily in the form of instruments repayable or partially repayable financial instruments (e.g. a loan with a partial redemption). The possibility of financing activities in the form of non-returnable co-financing is not excluded - this type of financing is envisaged, inter alia, for the construction of a stationary EMF emission monitoring system
- The entity responsible for the implementation of the investment is the Chancellery of the Prime Minister - Cyfryzacja (leader)
- The entities participating in the implementation of the investment are: Bank Gospodarstwa Krajowego (BGK), the Polish Development Fund (PFR), Centrum Projektów Polska Cyfrowa (CPPC), the Office of Electronic Communications (UKE), the Institute of Communications - National Research Institute and the MFiPR
- The support will be directed to telecommunications entrepreneurs, both for SME's and large enterprises, as well as to state research institutes and central offices of government administration bodies
- Target population: households, institutions of socio-economic importance, entities from vertical industries, research units and enterprises providing 5G services

Potential areas of investment / cooperation

Fiber optic cables, ducts, cabinets, connectors, raw materials for their production, earthworks, installations / construction of electromagnetic field emissions continuous monitoring points, drones infrastructure, autonomous machines and systems, smart cities solutions



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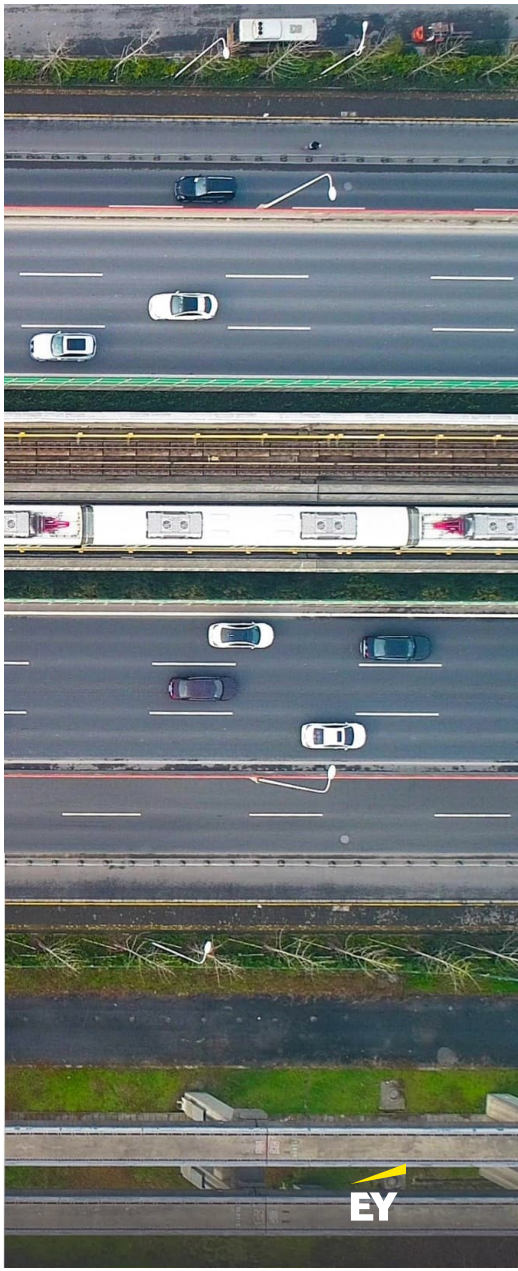

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