mBank Biuro maklerskie

mBank.pl

Friday, October 30, 2020 | research report

Polenergia: buy (new)

PEP PW; PEP.WA | Energy, Poland

A Clean Energy Play Set to Double in Size by 2025

We initiate coverage of Polenergia SA ("Polenergia," the "Company") with a buy recommendation and a target price of PLN 62.99. Polenergia is perfectly positioned to capitalize on positive medium-term trends in energy markets. At EU level, increasingly strict environmental standards generate upward pressure on prices of carbon emissions, and policy mechanisms are being created to promote the expansion of economically viable carbon-neutral energy sources. In Poland, RES producers are seeing a shift in policy through increasingly eco-friendly energy legislation. Polenergia has developed a pipeline of renewable energy projects to bring its wind power capacity to 300 MW and set up 120 MW of solar capacity over five years. In addition, the Company has obtained concessions to build wind farms off the Baltic Sea coast, but to move forward it will need to onboard additional sources of funding (we estimate the net present value of phase 1 of the offshore project at PLN 0.77bn). Polenergia also continues to grow its other business segments, including trading, where it recently launched energy aggregation services for independent RES, expected to add ~PLN 6m to this year's profits and grow consistently in the years ahead as Poland's RES capacity increases. Markets at the moment are bullish about low-carbon technologies, as reflected in massive ESG fund inflows inflows, and we see PEP as ripe for further re-rating with an EV/EBITDA ratio that shows a 15% discount to the peer multiple, which itself has expanded by 30% over the last five years.

Strict EU Climate Targets Support RES

The EU wants to bring forward the timeline for carbon emission targets, and this will most likely necessitate a reform of the Emissions Trading System to include other industries and adjust current factors and free carbon permits. By 2030 the volume of surplus EUAs will probably decrease from 1.6bn tonnes to 0.25bn tonnes, pushing the price from €25 EUR/t do €50/t. With rising emission costs, the cost advantage of low or zero-carbon energy sources of the kind being developed by Polenergia is set to grow

Project Pipeline Set Up and Ready to Be Built

Polenergia has ~200 MW of wind capacity and 27 MW of solar currently in development or in ready-to-build phase, combined with a further 300+ MW in early stages of preparation. Projects already underway have long-term financing in place, and the financing potential of Polenergia itself is estimated by us to be PLN 3+ billion over five years.

Diversifying Into New Profitable Segments

Polenergia's 2020-24 strategy plan identifies new areas of growth. One particularly promising line, which is already contributing to this year's results, is energy aggregation for independent RES producers, with estimated potential to generate PLN 10m in additional margin by 2024. Polenergia is also developing a B2B RES marketing strategy, and down the line it wants to develop advanced gas technologies and invest in co-generation units supplying power to industrial clients.

(PLN m)	2018	2019	2020E	2021E	2022E
Revenue	3,448.7	2,596.6	1,689.1	1,843.3	2,043.6
EBITDA	179.3	261.9	276.2	291.0	319.4
EBITDA margin	5.2%	10.1%	16.4%	15.8%	15.6%
EBIT	83.8	160.4	173.5	183.5	194.0
Net profit	3.4	109.0	105.8	108.1	105.5
P/E	568.7	17.8	18.3	17.9	18.4
P/CE	19.6	9.2	9.3	9.0	8.4
P/B	1.6	1.5	1.4	1.3	1.2
EV/EBITDA	14.1	9.3	9.0	9.5	9.6
DPS	0.00	0.00	0.00	0.00	0.00
Dividend Yield	0.0%	0.0%	0.0%	0.0%	0.0%

Current Price	PLN 42.60
Target Price	PLN 62.99
MCap	PLN 1.94bn
Free Float	PLN 0.63bn
ADTV (3M)	PLN 0.8m

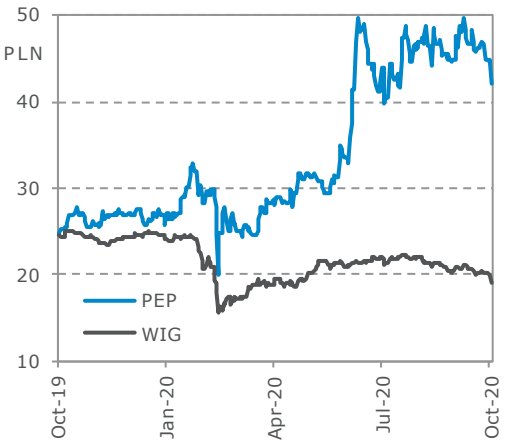
Ownership

Mansa Investments	51.64%
China CEE Investment Fund	15.99%
OFE Aviva	8.21%
OFE Generali	6.61%
OFE NN	5.66%
Others	11.89%

About

Polenergia an independent and vertically integrated energy group with a focus on clean energy. Today the Company operates 249 MW of onshore wind capacity and 8 MW of solar capacity, but it has ambitious plans to build the clean energy capacity up in the future. Polenergia is also an energy distributor with assets worth PLN 110m, and it owns gas-fired CHPs. Last but not least, Polenergia is involved in energy trading, and it is developing other lines designed to diversify its sales mix.

PEP vs. WIG



Company	Target Pric3		Recommendation	
	new	old	new	old
Polenergia	62.99	-	buy	-

Company	Current Price	Target Price4	Upside
Polenergia	42.60	62.99	+47.9%

Analyst:

Kamil Kliszcz
+48 22 438 24 02
kamil.kliszcz@mbank.pl

mBank Biuro maklerskie

Investment Case

We initiate coverage of Polenergia with a buy recommendation and a target price of PLN 62.99 based on DCF analysis and relative valuation.

A Growing Renewables Portfolio

Polenergia has a proven track record across the full lifecycle of renewable energy projects, and its current portfolio contains 249 MW of wind power capacity and 8 MW of solar power capacity. On top of existing capabilities, Polenergia is currently developing a further 186 MW of wind capacity and has it has 27 MW of solar and 13 MW of wind in ready-to-build stage, in addition to 82 MW of planned wind capacity in early stages. Polenergia's objective is to have 300 MW of RES ready to build by 2024. Early-stage solar projects have total capacity of 238 MW.

PLN 3 Billion Financing Potential

In 2020 Polenergia has secured bank financing for its most advanced RES projects, including bank credit in the amount of PLN 0.8bn and a PLN 0.23bn extended by the principal shareholder. Looking at its current cash resources and future dividend receipts from RES companies, at an average LTV of 70% we estimate that Polenergia has the potential to complete RES projects worth over PLN 3bn over the next five years. For our models we assume that capital expenditures in the 2020-25 period will amount to PLN 2.5bn.

Rising Emission Costs

The EU wants to accelerate the deadlines for the achievement of carbon emission target, an ambition which will most likely bring with it a reform of the EU Emissions Trading System through such measures as the inclusion of other industries in the trading scheme, upward adjustments to the linear reduction factor, and reductions in free allocation. As a consequence of the planned measures, we predict that by 2030 the volume of surplus emission allowances will decrease from 1.6 billion to 0.25 billion tonnes, resulting in a doubling of the current EUA price from €25 EUR/t do €50/t. With rising emission costs, the cost advantage of low or zero-carbon energy sources of the kind being developed by Polenergia is set to grow in a sustainable manner.

The Rising Value of Green Certificates

Energy certificates of origin in the Polish market are currently trading in around PLN 140/MWh. This year's theoretical cap imposed by law is PLN 300/MWh (replacement fee, currently unavailable, set at 125% of the average price of certificates in the previous year). Going forward, as the oversupply of green certificates is eliminated, prices are expected to go up to PLN 200/MWh for a wind farm with 0.7 TWh annual output.

The Rise of ESG Investing

When it comes to ESG funds as a value driver for the RES sector, in the second quarter of 2020 these funds registered inflows of $61 billion, which was equivalent to 30% of all money received by European investment funds in the period.

Globally, the flow of money into sustainable funds amounted to $71 billion, and assets surpassed $1.06 billion.

The equity portfolios of European equity funds recorded inflows of $35 billion in the second quarter, 63% more than traditional strategies. Furthermore, the rates of return on ESG investing are more attractive.

Poland's Discount to EU Peers

The sentiment of investors when it comes to the renewable energy sector is determined by policy and how regulations change to support clean technology, and by the potential of a RES firm to deliver sustained earnings growth.

The re-rating process took hold last year, but it has accelerated noticeably over the last few months. Out of 30 rated stocks, only four did not experience rises in their 12M FWD EV/EBITDA ratios in the last five years, with the median ratio now 30% higher than at the onset.

When it comes to Polenergia, its stock appears to be trading at a 15% discount to the average ratio of the peer group weighted by the proportion of different energy sources in total EBITDA.

Offshore Wind Project

Polenergia entered into a 50-50 joint venture with Equinor to acquire three licenses to build 3 GW wind farms off the Baltic coast. For the initial 1.4 GW of capacity, the construction of which is set to start in 2021, we made a rough baseline estimate that the NPV of Phase 1 attributable to Polenergia is PLN 0.77bn. Before the turbines start turning, however, the JV has to find additional capital to help fund the project. For this reason, fore the purposes of our models, the offshore wind project is only featured as the current value of the offshore license, i.e. PLN 0.15bn.

The Potential of RES Aggregation

Polenergia's lines of business as of recently include energy aggregation for small independent RES firms – an area where, eventually, the Company would like to have a market share of 20%. In 2020 the aggregation business is set to deliver a sales margin of approximately PLN 6m, and in subsequent years this figure can be expected to grow in line with the new RES power plants that are being developed in Poland outside of the mainstream energy sector – according to our estimates the volume of power from onshore wind and solar panels will increase to twice what it is today by 2025.

Key Risks

Regulatory Risk

Regulatory risks affect Polenergia through virtually all business areas connected with energy generation and sales through potential impacts on profits and investment returns. Poland's energy policy has been quite unpredictable over the last few years, and it has been marked by various makeshift solutions and fast-tracked legislation.

Obviously Polenergia also has to abide by the energy policies of the European Union.

Potential Capital Raise

Polenergia needs an estimated PLN 2.2-2.6bn for initial investment in Phase 1 offshore wind project (1.44 GW) – money which it should not take from the internal cash hoard due to a variety of other investments also in the pipeline. The Company can solve this either by taking on more co-investors for the venture, or by raising capital, in which case its value could become diluted.

Unfavorable Weather Conditions

Wind turbines and solar panels rely crucially on favorable weather conditions in order to operate with any efficiency (in terms of load factor, the amplitude range of average annual productivity of Polenergia wind farms is 6pp). Unfavorable operating conditions can negatively affect performance, sales, and balancing costs for Polenergia itself as well as for its aggregation customers.

Energy Price Risk

Polenergia's takings from the current energy mix are effected by price movements in the Polish energy market, whereas its costs are largely fixed. For example, any 30-zloty change in the price of a megawatt hour can reduce or increase annual revenues from onshore production by +PLN 20m (~10% of 2020E EBITDA).

Coronavirus Pandemic

Economic lockdown necessitated by the spread of COVID-19 has a direct impact on the energy industry because it lowers demand for electric power while raising the cost to balance power trading positions, and cuts into the revenues of distribution system operators. In the wake of the spring lockdown, in Q2 2020 Polenergia suffered a 21% decrease in distribution volumes and an 18% decrease in sales to end consumers. If another lockdown is introduced in Poland, this can have similar consequences as well as potentially affecting timely payments from customers.

Increase in Financing Costs

Financing is a major determining factor of the economic viability of a RES project. Polenergia reported having PLN 0.79bn in outstanding loans to banks as of 30 June 2020. All credit is denominated in Polish zloty with an estimated average margin above over the WIBOR rate of 3.2% in the last three years. Note that Polenergia effectively hedges interest rate risk in today's low-rate environment (at the moment the Company is hedging more than 50% of total exposure).

Market Overview

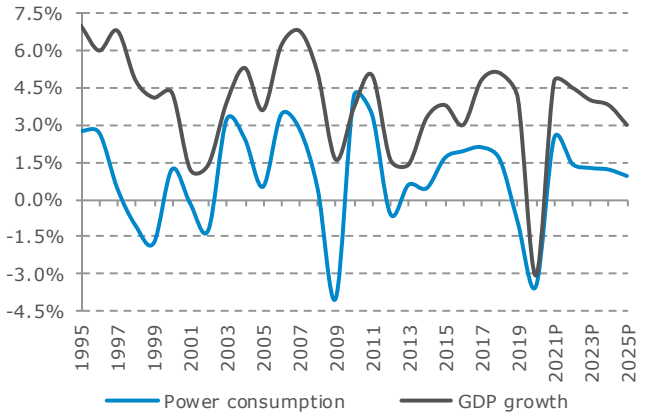
Supply and Demand

Electricity consumption in Poland in the mid-term is correlated with GDP and industrial production, although the correlations have recently softened due to a **marked trend of energy efficiency improvements** and the contraction of energy-intensive processes. Those developments are particularly strong in the segment of the biggest corporations and households, which account for 20% and 22% of total demand, respectively.

The energy consumption CAGR 5Y of those customer segments is -0.1% and +0.6%, respectively, vs. GDP CAGR 5Y at +4.2%. By comparison, consumption CAGR 5Y in the medium-sized enterprise segment is +3.2% (vs. +1.8% for smaller commercial customers).

This year has been quite specific due to the impact of COVID-19, even if demand in Poland in 2Q fell much less than in Western Europe (-8.5% vs. -15-20%). According to our macroeconomists' GDP forecast, **annual energy consumption will drop 3.5% in 2020**. It should pick up by +2.5% in 2021 and then sink by 1% by 2025 vs. GDP growth of 3%. In this scenario, **annual demand in the next five years will rise by approx. 12 TWh**, which is equivalent to the capacity of a 2.0-2.3 GW conventional unit (load factor 60-70%).

Electricity consumption vs. GDP in Poland



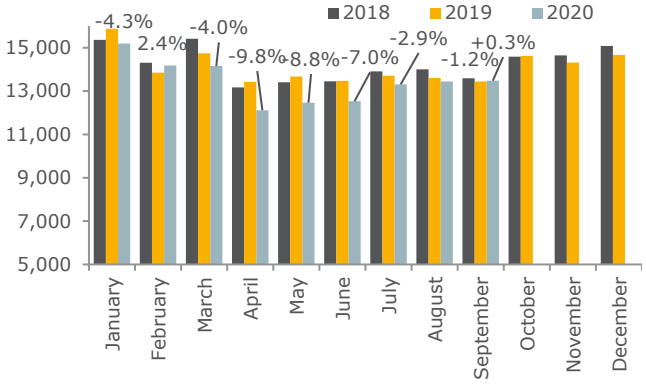
Source: PSE, mBank estimates

An analysis of monthly consumption figures mirrors the **impact of weather conditions on YoY consumption growth**. Higher temperatures in January and February are the main reason for weak growth in those months (February figures are additionally distorted by an extra 29th day of the month) even before the pandemic which did not affect the statistics until mid-March. In May and June, in turn, the adverse impact of COVID-19 was augmented by lower temperatures. **Due to those factors, the reference base for 2021 may be underestimated**, which is reflected in our projections.

As consumption remained on the downtrend in July and August and was stable in September, economic activity remained under the pre-pandemic level. The segment of small and mid-sized commercial customers is the most affected (-10% in 2Q'20). Household consumption under lockdown grew +3%, as could be expected.

Our baseline scenario does not include a new lockdown; however, even in the absence of large-scale government restrictions, demand is unlikely to show a major YoY increase in the next few months (after improvement in September, PSE figures for the last four weeks are once again on a decline by -0.5% YoY).

Monthly electricity usage in Poland (GWh)



Source: PSE

When it comes to supply, the Polish energy mix has been undergoing a change over the last few years. The energy mix in 2020 implies a further **decrease in coal,** including both lignite and hard coal, driven by the shrinking demand, growing imports, and changes to the domestic merit order (bigger production from gas and RES) Under the circumstances, PSE will (as it did last year) **reduce the use of newer, bigger and more efficient units in order to maintain minimum production of 200 MW units** necessary to ensure overall system safety (flexibility). For example, despite higher availability in 1H'20, the capacity utilization of PGE's lignite-fired power plants continued to fall (58% vs. 65% in 2019 and 75% in 2018). The figures may improve in 2H owing to the low reference base (many maintenance outages in 2H'19) but the trend is unlikely to revert permanently. New 1000 MW coal-fired units at Opole and Kozienice currently have a net load factor of 46% and 54%, respectively, while the expected load factor of those projects was 70%. A new 910 MW unit at Jaworzno will come online, adding to supply this November, which may also affect the load factor of the other units.

Polish electricity production by source

TWh	2018	2019	y/y	9M'20	9M'19	y/y
Utility power plants	143.2	134.2	-6%	91.8	100.8	-9%
CHPs incl.	141.0	131.8	-7%	89.8	98.8	-9%
hard coal	82.4	78.2	-5%	51.4	58.6	-12%
lignite	49.1	41.5	-15%	28.5	31.7	-10%
Gas-based plants	9.6	12.1	26%	9.9	8.5	16%
Hydro	2.2	2.5	12%	1.9	1.9	1%
Industrial power plants	10.0	10.2	2%	7.1	7.4	-5%
Renewables	12.0	14.3	20%	11.7	10.2	16%
Total	165.2	158.8	-4%	110.6	118.4	-7%

Source: PSE

As already mentioned, the precarious position of coal-fired units is partly **due to growing imports**. After a sharp increase in 2019 (start-up of the Krajnik-Vierraden line following the installation of phase shifters), PSE's figures show that the trend continues (up by 2.8 TWh in 9M).

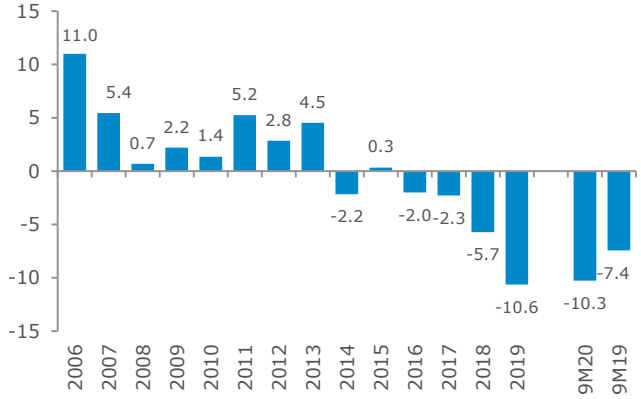
However, growing international exchange this year has mainly been driven by the **implementation of Regulation 2019/943 which requires that at least 70% of the existing transmission capacity must be made available**. Due to "structural congestion", Poland will implement the Regulation along a linear trajectory by the

end of 2025. The lowest starting point is the infrastructure at the synchronous interconnector DE/CZ/SK (0-20% of capacity currently available on market terms). The connectors with Ukraine, Lithuania, and Sweden (total import capacity 1320 MW) already meets the 70% capacity requirement for imports.

We refer below to planned investments in new trans-border connectors by 2030. Considering those projects and the impact of the Regulation, **assuming that the current price differential persists** (an obvious assumption given current spreads although, with the decommissioning of nuclear and coal, changes in the German energy mix may boost prices in Germany), **imports may in theory increase by 13-14 TWh annually by 2026** (addition/availability of import capacities > 2000 MW). Consequently, **imports are unlikely to exceed 15% of domestic consumption i.e. 18 TWh in 2030**.

- **Synchronous interconnector PL/DE/CZ/SK** – the Krajnik-Vierraden line will be completed by the end of 2021, making available 500 MW of import capacity. The GerPol Power Bridge I will be completed by the end of 2024, adding another 1500 MW to import capacities. A second bridge at the German border with a capacity of 1500 MW may be added after 2030 but the decision is yet to be made.
- **Interconnector with Lithuania**: a second cross-border line with Lithuania (undersee cable) will be put in place by the end of 2025, adding 700 MW to the import capacity. The Commission has recently announced an allocation of approx. EUR 720m for the synchronization of the Baltic States and Poland, including EUR 500m for the undersea cable.
- **Interconnector with Denmark**: a 600 MW cross-border interconnector is under consideration but the potential investment project will not be completed before 2030.
- **Interconnector with Ukraine**: reactivation of the Rzeszów-Chmielnicka line (500-600 MW) is regularly revisited but no decision has been made.

Net electricity exports from Poland (TWh)

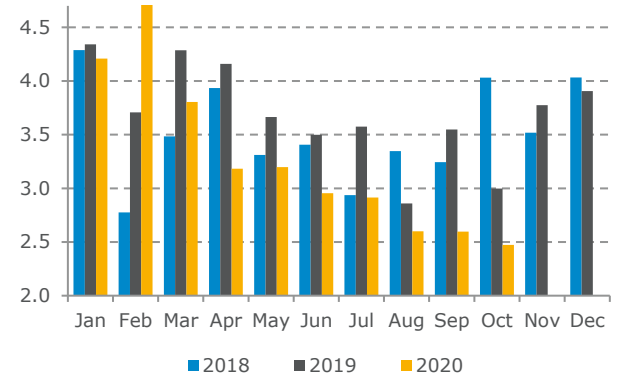


Source: PSE,mBank

In addition to falling demand and rising imports, the drop in the capacity utilization of coal-fired power plants is mainly driven by **growing energy production from renewable energy sources**. The addition of the nominal capacity of wind farms (+500 MW YTD) has been partly offset this year by much less auspicious wind conditions (-10% YoY due to an overstated reference base as 2019 witnessed particularly strong winds). However, wind energy generation increased 2% in 9M 2020 (+0.2 TWh).

Photovoltaic energy production is growing even faster, driven by new systems including prosumer schemes ("Mój Prąd") as well as auctions completed in previous years. According to PSE's figures, PV nominal capacity in Poland exceeded 2.68 GW in early October while annual production may cross the mark of 1 TWh in 2020.

Average wind speed in Szczecin by month (m/s)



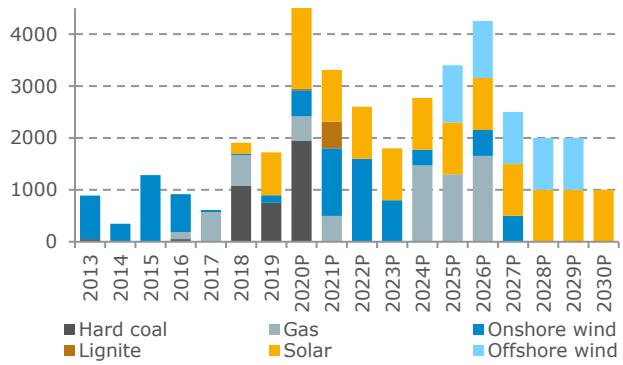
Source: WFOR, mBank estimates

RES capacity is bound to increase further in the coming years as a result of prior auctions (approx. 3.4 GW wind and 1.7 GW PV) as well as upcoming auctions (the government is expecting to contract approx. 0.8-1.0 GW wind and 1.5 GW PV in 2020 and 0.3 GW wind and 1.7 GW PV in 2021). That will add **approx. 10 GW of RES capacities by 2025, excluding off-shore wind farms** which will add another 5.9 GW by 2030 (see below for details of RES development).

In addition, **PPA contracts** are becoming popular where projects are financed without government support. However, the potential of that segment is hard to quantify at this time.

The same goes for the development of **prosumer photovoltaic micro-systems**. The "Mój Prąd" scheme will support 200k new systems with a total capacity of ~1000 MW (130k applications have been filed for a total capacity of 730 MW). Even if the scheme is not extended, the recoupment period of rooftop panels may seem attractive (8-9 years). Consequently, the supply of solar energy in this segment may continue to grow, although distribution network constraints may pose a challenge in the coming years.

Forecast increase in installed capacity by source (MW)

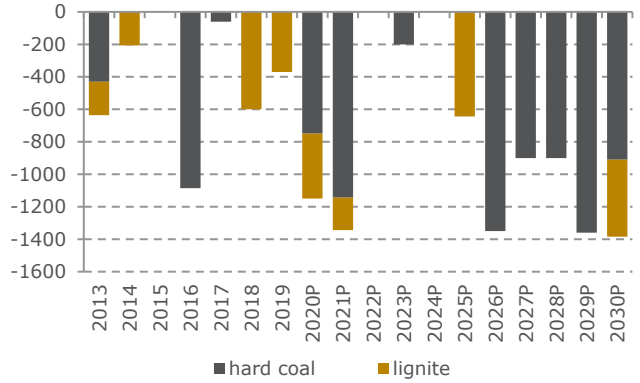


Source: PSE, Polish Energy Regulatory Office, mBank estimates

Conventional power supply will also continue to grow. A new 910 MW coal-fired unit at Jaworzno will come online later this year, and a 496 MW lignite-fired unit at Turów in 2021. Gas-fired CHPs at Stalowa Wola (synchronized in August 2020) and Warsaw (CHP Żerań, to start up in April 2021) will also join the system.

The capacity auctions for 2024 have contracted 1400 MW of gas-fired units at ZEDO and 70 MW at Oświęcim. Other gas-fired projects in the pipeline include: Grudziądz (600 MW potentially in 2025), Ostrołęka (700 MW in 2025), Rybnik (700 MW potentially in 2026), CHP Siekierki (500 MW in 2026), and Gdańsk (456 MW in 2026). **The total addition of gas-fired capacity is estimated to reach ~5 GW by 2026-27**.

Expected unit decommissioning by 2030 (MW)

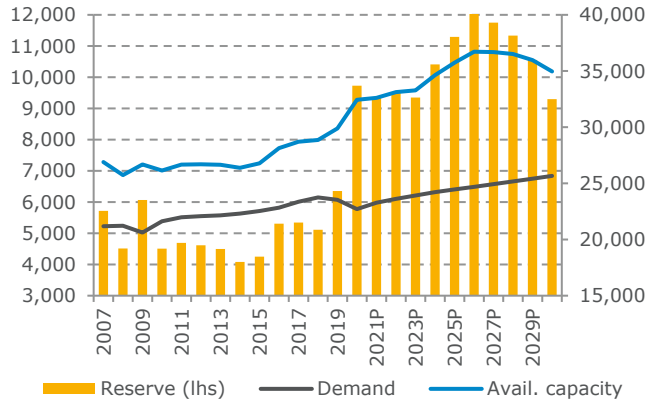


Source: mBank

Meanwhile, **older coal-fired units will be gradually decommissioned**. The trend will step up after the expiry of the capacity market support scheme in 2025. **Capacities to be decommissioned by 2030 may reach >10 GW**, including mainly hard coal (e.g. ZEDO, Rybnik, Jaworzno, Łaziska, Kozienice). As for lignite-fired units, only ZEPAK is planning decommissioning of Pątnów I and Pątnów II units with a total capacity of 1.1 GW. CHPs Turów and Bełchatów will not be decommissioned until the following decade.

In addition to the falling load factor, coal-fired CHPs will be decommissioned due to the **discontinuation of the capacity market support scheme** (mid-2025) and due to **BAT/BREF requirements** (non-conformant units may request derogations, extending their operation in the system, even if the conclusions take effect in August 2021).

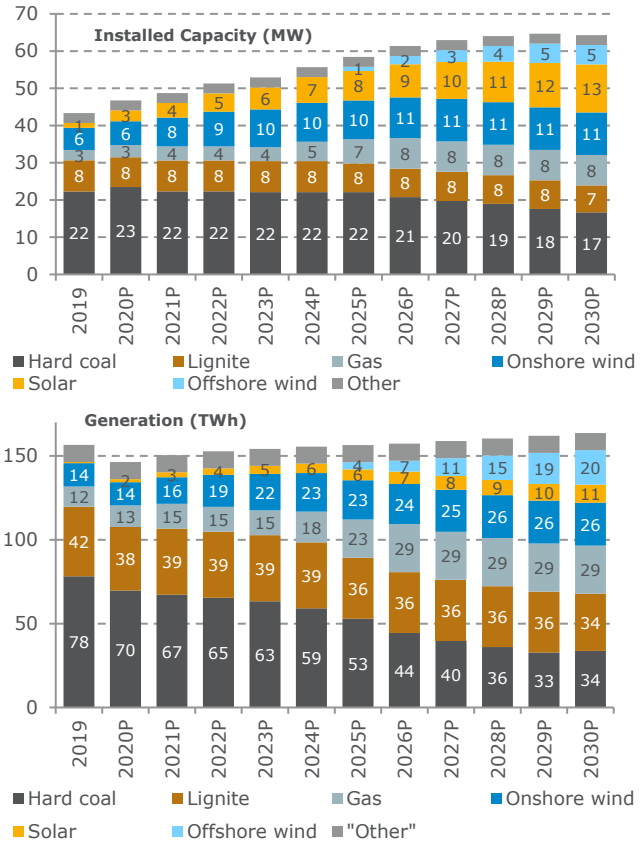
Projected average daily capacity reserves* in the Polish system (MW)



*simplified calculation based on availability of conventional units at 80% and an average load factor for all RES
Source: mBank estimates

Given those planned additions to installed capacity and expected decommissioning, the **total capacity reserve available in the Polish system will exceed 12 GW in 2026** vs. 6 GW in 2019. The first phase of additions took place in 2020 (Opole, Jaworzno, ECSW). Further bigger additions are expected when off-shore wind farms come online. The surplus capacity will decrease year after year but it will still exceed 9 GW in 2030.

Poland's projected energy mix by 2030 – installed capacity vs. production



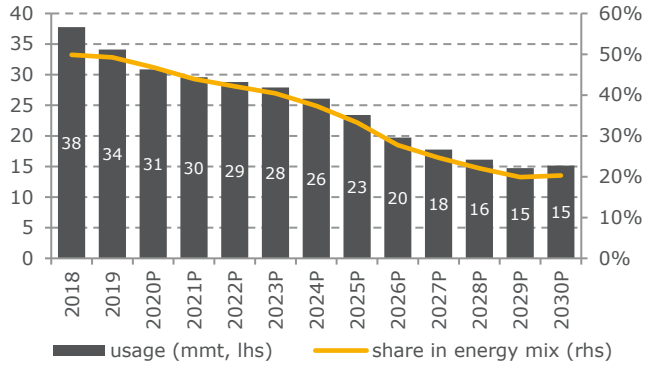
Source: mBank

To summarize, net installed capacity in Poland will increase 17 GW by 2030 but **production from local sources** will only increase ~12% due to continued **increase in imports** (covering 10% of demand in 2030 vs. 9% now) and **lower model productivity** of new RES production.

According to our scenario, the share of hard coal in the mix will drop from 47% now to 20% by 2030 (hard coal + lignite: from 72% to 41%). The final coal-fired production will evidently depend on PSE's decisions and the load factor of gas-fired power plants (the coal/gas price spread and CO_2 prices).

According to our estimates, with a load factor of 40% for gas, the load factor of hard coal-fired units will drop from 35% to 22%. Consequently, more capacity will be decommissioned than expected. The technical minimum load factor being 40%, **6 GW power plants will face the dilemma of decommissioning in the second part of the decade**.

Share of hard coal in energy production vs. demand for hard coal in the energy sector (mn tonnes)



Source: mBank

Energy Policy by 2040

Let's confront those calculations with the government's official plans for the Polish energy mix. Last September, the Ministry for Climate Change published an updated framework of its Energy Policy by 2040 but **the official document will only be released after it is approved by the government**. According to that brief presentation, the detailed draft published in November 2019 has been amended as follows:

- Plans for offshore wind farms have been upgraded (from 3.8 GW to 5.9 GW, according to the draft offshore law), **which coincides with our scenario**;
- Onshore wind assumptions have remained largely unchanged (8-10 GW vs. 9.6 GW) while the photovoltaic targets have been slightly downgraded (5-7 GW vs. 7.3 GW); **our 2030 targets are 22.4 GW onshore and 12.9 GW PV**;
- The coal decommissioning trajectory remains unclear as two scenarios were presented: the "old" scenario with coal (hard coal + lignite) at 56% in 2030 and 28% in 2040, and a more ambitious scenario with targets at 37% and 11%, respectively. However, according to recent arrangements between the government and protesting coal miners, the former will be the default scenario; **our scenario is that the share of coal in the energy mix will drop to 41% in 2030**. In this regard, official government papers must respect the arrangements with the miners (see below) but the **declared intention to keep up a higher share of coal may be difficult to uphold**;
- The plans to develop nuclear units have been confirmed (6-9 GW target) in line with the scenarios recently published under the Polish Nuclear Energy Programme (first 1.1 GW reactor to go online in 2033, each additional unit to launched every two years); **in our opinion, the probability of the project is low due to high financial risks, incompatibilities between the nuclear project and the energy mix by 2030 (broad development of RES), and the EU's hydrogen policy**. However, given that the deadlines of potential binding decisions are quite remote (construction permit in 2026), the project may remain on the public agenda in the coming years.

Energy Transition

The key issues in recent months include the transition of the Polish energy industry and the closely related reorganization of State-owned conglomerates, including the spin-off of coal assets. Only speculations have been in circulation until now in the absence of any official concepts. We have summarized the potential scenarios below. Note that the transition will impact the market across the board as it will restrict competition and change the factors of price formation. The Ministry of State Assets has nominated KPMG as its advisor in the process.

Coal Spin-Off

The idea of spinning off the coal assets, proposed by PGE, has been approved by the government. However, no detailed plans have been released. The main objective of the operation is to ensure that conglomerates are in a position to fully finance their investment projects on the financial market whose lending and insurance decisions increasingly consider climate risks (ESG, taxonomy, share of coal in the portfolio). Coal assets could be spun off as follows:

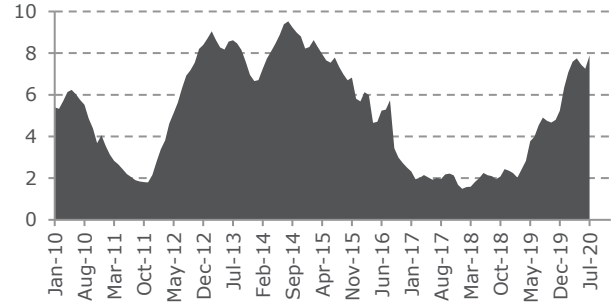
- **Spin-off of the "clean" and the "dirty" business of existing conglomerates.** The "dirty" business with a decommissioning plan would need to be fully capable of repaying its allocated debt. The solution could include support schemes, such as those recently offered in Germany i.e. capacity decommissioning auctions or early decommissioning mechanisms (EDM).
- **Setting up NABE**, a national agency to gradually take over coal assets from companies either for cash or through asset swaps combined with consolidation (e.g., PGE contributes coal to NABE and gets Enea or Tauron shares from the State in return).

A transition scheme with state aid would certainly need to be **notified to the Commission**. As such, the consolidation would also be decided in Brussels even if, in the absence of exposure to foreign markets, the only purely formal requirement is the approval of Poland's competition authority UOKiK. The government would need to **design mechanisms protecting the energy market** from excessive concentration of energy production that could distort the formation of wholesale energy prices. As a side effect of transition in this scenario, **the sentiment around the entire industry would improve and the rating of public companies traded on GPW would be upgraded**, as described in our June special commentary (link).

Coal Mine Decommissioning Plan

As an intrinsic part of Poland's energy transition, coal mining will have to be restructured and/or decommissioned. As already mentioned above, the share of coal in energy production is falling steadily in line with a trend which is bound to continue. The supply surplus (sales are falling faster than production) has boosted **coal reserves on mounds to nearly 8mn tonnes** (annual production of energy coal is approx. 45mn tonnes).

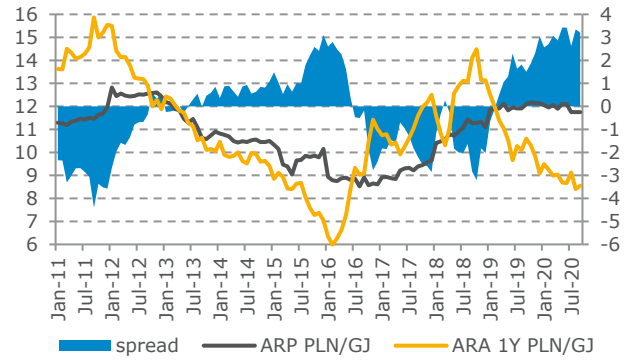
Poland's coal reserves (mn tonnes)



Source: Polish Industrial Development Agency (ARP)

Global trends on the coal market are not helping, either. With falling consumption and a quick transition from coal to gas, pressures on ARA benchmark prices continue to mount. With its specificity (long-term contracts with power plants at rigid price formulae), prices on the Polish market have not yet adjusted and are unlikely to immediately adjust to the import parity. However, **import arbitrage will force local prices down sooner or later**. The current spread (see figure below) between the prices of coal supplied to Polish power plants and ARA prices is more than 3 PLN/GJ for annual contracts and nearly 4 PLN/GJ for monthly contracts.

Coal prices for Polish power plants vs. ARA 1Y FWD (PLN/GJ)



Source: Polish Industrial Development Agency (ARP),Bloomberg, mBank

Under the circumstances, Polska Grupa Górnicza is (once again) on the brink of bankruptcy, awaiting a PLN 1.7bn emergency loan from PFR. In the meantime, the government has been drafting a long-term restructuring program for Poland's coal mining industry. The first radical but most realistic draft (total decommissioning of production by 2040, quick close-down of several mines) was rejected by the trade unions even before the Ministry of State Assets had a chance to present it. Social consultations **have reached an arrangement whose framework (and our commentary) is presented below**.

- **Social contract**: A social contract governing the mining industry is to be drafted by 15 December.
- **Mine close-down schedule:** PGG and Węglokoks mines are to be closed down by 2050, in the majority in the late 2030s and in the 2040s. **The timeline neither resolves the current coal oversupply nor does it correspond to the expected mid-term drop in demand.** The Timetable:
  - **2021-29:** Pokój (2021), Wujek (2021), Bielszowice (2023), Bolesław Śmiały (2028), Sośnica 2029) - **in total 6mn tonnes**
  - **2030-39**: Halemba (2034), Ziemowit- Piast (2035-36), Murcki-Staszic (2039) **– in total 11.5 tonnes**
  - **2040-49:** Bobrek (2040), Mysłowice Wesoła (2041), ROW (2043-49) - **13mn tonnes**
- **State aid notification:** State aid to be notified to the Commission involves the financing of current production until the mines are closed down (including guaranteed employment until retirement). **The Commission's approval for such state aid could become a problem as it would be in breach of the applicable regulations. Clean coal investment: An extraordinary derogation would be possible under EDM (early decommissioning mechanism) but financing of unprofitable mines for another 10-20 years has nothing to do with any EDM.**
- **Clean coal investment:** The idea is to invest (consider investments) in low-emission and no-emission coal technology e.g. CCU at Łaziska, a power plant owned by Tauron Group. **That idea seems absurd given the plans to close down the mines, just like the idea of investing in expensive technology at a 1970s power plant scheduled to be decommissioned in 2026-27.**
- **Elimination of the requirement to sell energy on the exchange:** As previously expected, the government has pledged to eliminate that requirement in order to reduce energy imports. **That could marginalize TGE and affect market transparency without even impacting imports. Bilateral transactions in energy within State-owned groups will keep retail prices high and shift the inflated cost of coal to consumers. Given the big energy oversupply, such legislative amendments could be of little effect.**
- **The arrangements vs. Energy Policy 2040:** According to the arrangements, the final draft of Poland's Energy Policy will depend on the provisions of the social contract governing the coal mining industry. **It will be very hard to integrate the presented coal mines decommissioning timeline into the Energy Policy, especially that the final draft suggests that most of the Silesian coal mines will be unable to sell coal by 2040 due to expensive CO_2 allowances**.

In summary, the arrangements between the government and the miners' trade unions comes as a breakthrough only in one respect: it is the first official declaration ever that all of the Silesian mines will be closed down. However, the arrangements are in most part completely unrealistic and will have to be revised more than once, especially that the plans will soon be reviewed by the Commission.

Potential Sources of Financing the Transition

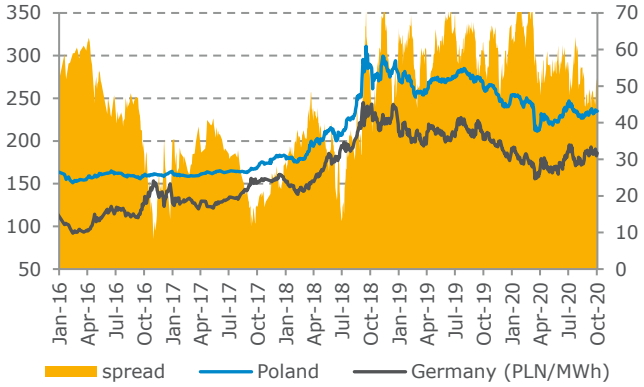
Looming in the background of discussions about the transition of the Polish energy sector are potential sources of financing including EU and national funds. Evidently, only a part of PLN 200bn available by 2030 (Ministry for Climate Change estimates) may be used directly by businesses (a large part of that amount will be allocated to local governments) but it can still represent a major cash injection for new RES investments, improving the balance sheets of market players in the industry. The funds available directly and indirectly to the energy sector are enumerated below.

- **Just Transition Fund:** a new fund for 2021-27 (Poland's allocation is approx. PLN 15.5bn/EUR 3.5bn of grants) to support regions in transition to a climate neutral economy. The funds may indirectly help to implement difficult structural changes in companies by supporting local communities.
- **EU Modernization Fund:** funded by Commission through sales of CO_2 allowances in 2021-30. Poland's allocation is 135mn tonnes at a present market value of ~PLN 17bn. The Fund will finance investments in RES, transmission networks, energy efficiency improvements and emission reductions (up to 100% of eligible expenses). The Fund will be administered by the Member States with the participation of EIB and the Investment Committee (representatives of 10 Member States which are Fund beneficiaries, 3 non-beneficiary Member States, EIB, and the Commission) in the project approval process.
- **National modernization fund:** a national special-purpose fund, financed by the Polish government through sales of CO_2 allowances. In September 2019, Poland decided to allocate 270mn tonnes of allowances at a present market value of approx. PLN 32bn to the fund.

Energy Prices in Poland

Energy prices in Poland under annual contracts have ranged from 230 to 240 PLN/MWh in the past few months in correlation with the German market but largely due to changing CO_2 prices. Hard coal-fired units remain the marginal power plant. Due to the specificity of long-term supply contracts with PGG coal mines, the volatility of ARR prices has little effect on TGE's benchmark. However, **growing available capacity reserves** in the system (commissioning of new conventional units combined with the development of RES) **increasingly impact** price formation, as demonstrated by the **shrinking PL/DE cross-border spread**, which was more than 60 PLN/MWh on average in 2019 and has since dropped to less than 50 PLN/MWh.

Poland vs. Germany electricity price spread (1Y fwd contracts, PLN/MWh)

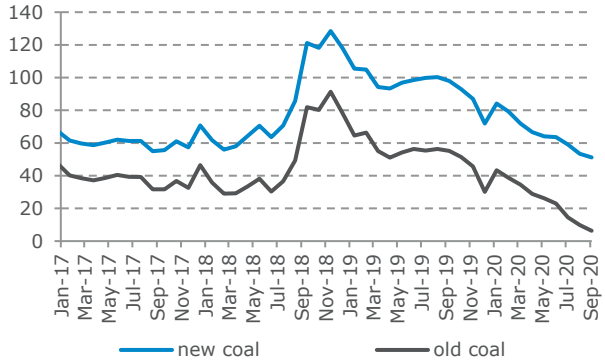


Source: TGE, Bloomberg,

Growing power supply combined with weak demand (-0.9% in 2019, -3.5% in 2020 YTD) as well as growing imports of cheap energy (+9 TWh since 2018) **affect the model margins** of conventional coal-fired power plants. Below are our CDS 1Y FWD calculations for new (efficiency 45%) and old (efficiency 37%) coal-fired units, assuming that the current coal prices remain stable in 2021.

Current figures differ from our previous projections for 2021 although our baseline scenario expected the units' CDS to drop by more than PLN 20/MWh to 81/MWh and 36 /MWh, respectively. In fact, 1Y FWD in September was PLN 51/MWh and 6/MWh, respectively (PLN 66 and PLN 25 YTD). The lignite spread has also suffered (<PLN 100/MWh vs. PLN 140 on average in 2020 contracting). Those power plants also face the problem of forced reduction (load factor down YoY from already low levels in 2019).

Model CDS of coal-fired units (PLN/MWh) ("old" units with 37% efficiency and "new" units with 45% efficiency)



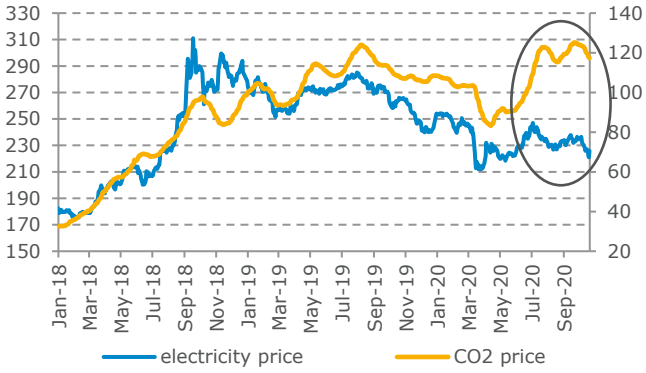
Source: mBank estimates

Evidently, the YoY decrease is partly driven by the expected **opening of the capacity market and changes on the balancing market** (elimination of emergency capacity reserve, operational capacity reserve, and intervention traffic, see below for details) but our model estimates the impact at approx. 17-20 PLN/MWh.

Otherwise, the decrease is due to changes in the merit order, affecting the emission factor of the marginal unit. The actual unit cost of allowances for coal-fired units has increased by approx. 20 PLN/MWh during the year without however affecting the energy prices.

Note that the **average emission factor of energy production in Poland was 0.86 t/MWh** in 2018 while it may reach 0.77 t/MWh in 2021. In our baseline scenario of Poland's energy mix, **the emission factor drops to 0.5 t/MWh in 2030**. Consequently, the transmission of allowance prices to energy prices will be steadily shrinking.

1Y FWD TGE energy prices (PLN/MWh) vs. CO_2 prices (PLN/t) and share of wind/PV in total production (table)

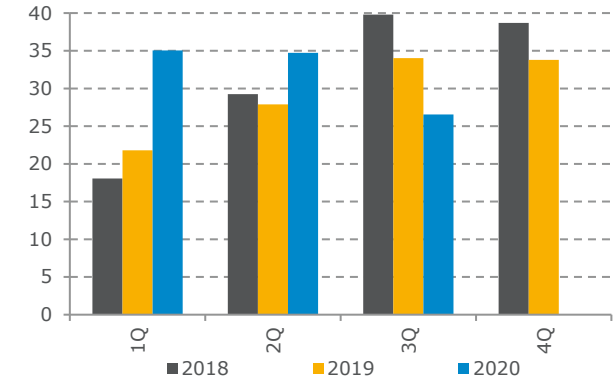


	2016	2017	2018	2019	2020
Q1	8.0%	8.0%	7.4%	12.0%	13.0%
Q2	5.9%	8.3%	7.2%	7.4%	10.2%
Q3	5.3%	5.2%	4.8%	6.9%	8.4%
Q4	9.4%	10.8%	8.7%	10.3%	

Source: TGE, Bloomberg, mBank estimates

Volumes traded in annual contracts on TGE YTD are up modestly compared to the same period of 2019 (+8%). **Trading has subsided slightly** in the last few months, probably due to regulatory uncertainty (risk that capacity payments may be suspended, discussion on an elimination of the requirement to sell energy on the exchange), as well as the threat of a new wave of the pandemic.

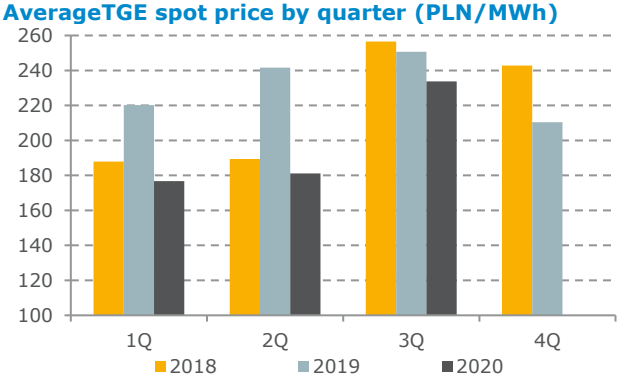
Annual contracts trading volume on TGE (TWh)



Source: TGE, estimates by mBank

Historically, forward prices have always been strongly driven by spot prices. However, that correlation has been disproved in the last few months as **annual contracts did not react at all to a sharp recovery of Day-Ahead Market prices**.

AverageTGE spot price by quarter (PLN/MWh)



Source: TGE, estimates by mBank

That may be due to the fact that high Day-Ahead Market prices in 3Q were boosted by an **overlap of scheduled and contingency maintenance outages** in the system (see the table below). The deadline for compliance with the BAT conclusions is August 2021, which implies that the **availability of units is likely to be much higher in 2021**.

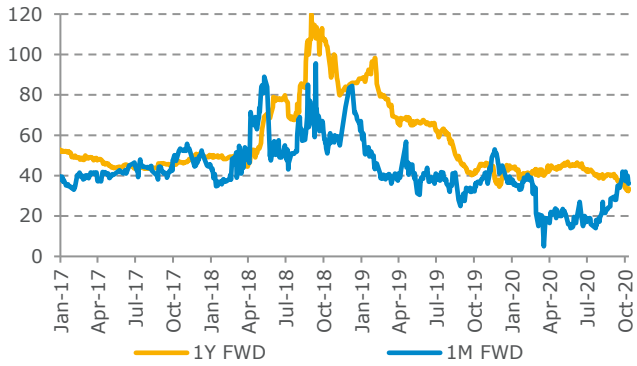
Scheduled and contingency capacity outages in the national power system (MW)

	2018	2019	2020
Q1	5,597	7,023	8,228
Q2	6,855	9,289	7,798
Q3	6,937	7,850	9,548
Q4	6,538	7,631	9,272

Source: TGE

Quotations on the Polish energy market have changed significantly with regard to the **narrowing of the spread between base prices and peak prices,** clearly driven by dynamic rise of PV generation which accounted for >2% of total production in the spring and summer. Those developments will only strengthen as the PV nominal capacity is expected to double in the next three years.

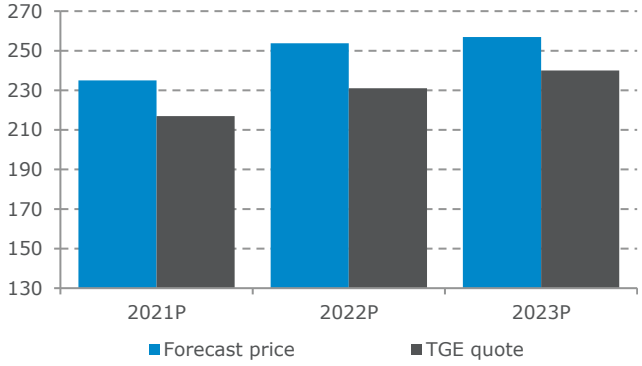
Peak/base spread for year-ahead and 1M forward contracts



Source: TGE, mBank

Considering the foregoing trends, the launch of the capacity market in 2021, the expected changes in the merit order (falling average emission factor, see above), and the new, more aggressive CO_2 trajectory (see below), we have upgraded our energy price forecast for the Polish market **by 15% on average in 2021-29**. Rising allowance prices (up to 50 EUR/t in 2030) will be partly offset by the aforementioned changes in the production mix. Our model **energy price trajectory in 2021-23** is **8% above the current TGE forward price curve** (due to CO_2 price assumptions).

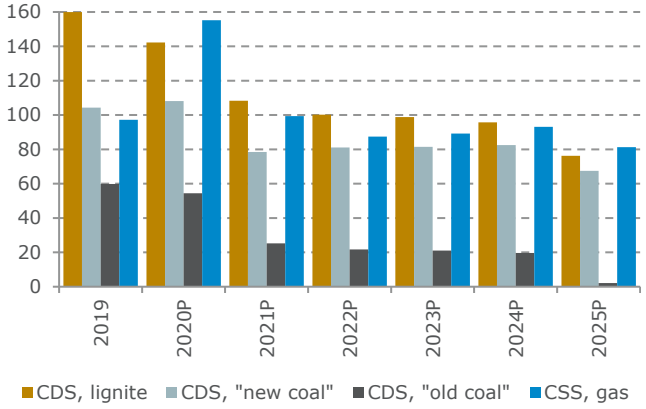
Forecasts of wholesale electricity prices in Poland versus TGE market prices (PLN/MWh)



Source: mBank estimates, TGE

That upgrade of the price trajectory significantly **impacts the expected model margin of conventional units**. Rising CO_2 costs will be transferred less and less to energy prices, resulting in compression of coal-fired power plants' CDS. We expect that **base prices will no longer cover variable expenses of old coal-fired units in 2025**. Under those circumstances, only gas-fired units will generate stable returns.

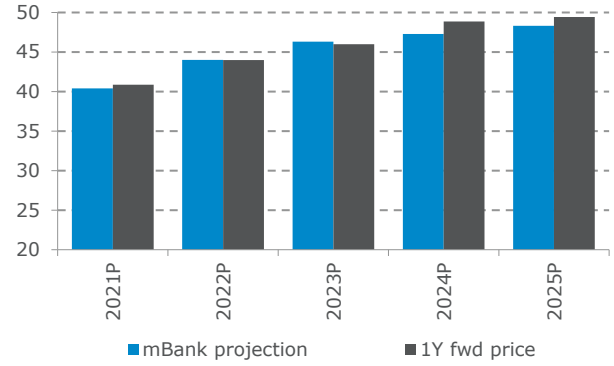
Projected model margins for conventional power plants (PLN/MWh)



Source: mBank estimates

The CO_2 price upgrade also impacts our price forecast for the **German market**. **We have upgraded the base price for 2021-29 by 15% on average**, taking into account that the transmission of CO_2 costs will evolve with changes to the energy mix (decommissioning of nuclear and coal power plants replaced by RES and greater utilization of gas-fired units). Our estimates for 2025 are close to the current forward curve.

Projected wholesale energy prices in Germany (EUR/MWh)



Source: mBank estimates

Balancing Market Reform

In view of the required harmonization of Polish regulations with EU Regulations and the capacity market notification, Poland needs to reform its balancing market. The changes will be implemented in two phases:

- **Phase 1** (update sheet to be approved by the year's end): opening the balancing market to balancing DSRs, energy storages, and non-centrally dispatched generating units (nCDGU); discontinuation of existing system services (intervention capacity reserve, operational capacity reserve, intervention traffic, DSR intervention scheme) and modification of the marginal price mechanism (more attractive fees for system balancing participants, less attractive fees for participants causing imbalances). The modifications will reduce arbitrage between the spot and the balancing market, encouraging market players to balance positions on TGE.

- **Phase 2** (draft update sheet soon to be presented): implementation of capacity scarcity pricing which imposes an add-on on balancing prices depending on operational capacity reserves in the system, combined with the introduction of self-dispatching where market players directly dispatch production and respond to potential issues.

The discontinuation of the existing system services should already be factored into 2021 contract prices. Prices will be impacted mainly by the **elimination of the operational capacity reserve**, which adds approx. PLN 11/MWh to the model base price in 2020 vs. PLN 14/MWh in 2019 (the average price in 9M'20 was PLN 25 /MWh at 3,825 peak hours and the budgeted price was PLN 44.2).

Market players may expect their revenues to fall in the absence of the operational power reserve (PLN 150m) and intervention traffic contracts with pumped-storage plants. That **attrition may get partly transmitted to energy prices** (for instance, storage offered by pumped-storage plants). Furthermore, a **higher price penalty for imbalances** (in particular starting in 2022) may boost spot prices, and the increase may get transmitted to forward prices, as well. In this context, it is very difficult at this time to precisely quantify the impact of the reform on market prices.

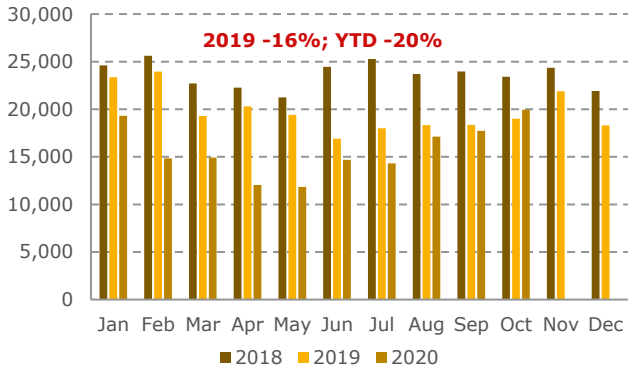
CO_2 Market

The revision of the allowance price scenario is a key part of our upgraded energy price trajectory. The key facts, findings, and arguments in support of that radical verification of assumptions are presented below. **The market did not react to emission reductions in 2019/20:**

- According to the Commission, CO_2 emissions in the ETS dropped by 9% in 2019 (-4% in 2018), nearly 30% more than expected. European emissions are likely to fall yet further in 2020 due to smaller energy consumption (COVID-19), which has mainly affected coal-fired power generation (see figures below: hard coal and lignite-fired generation -20% YTD).

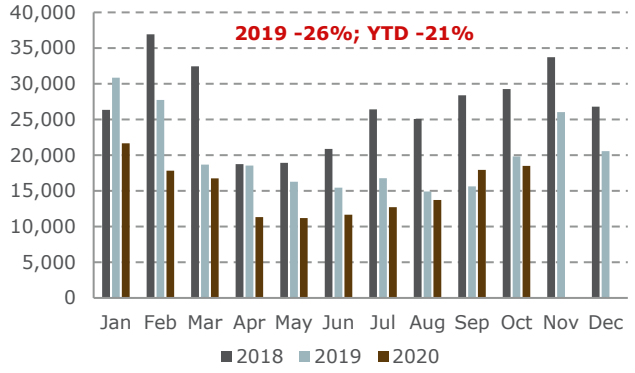
- However, after a temporary slump in March, CO_2 prices peaked once again, suggesting that the market is driven less by the current balance of demand and supply and more by the regulatory outlook and the activity of speculative capital, including investment strategies focusing on ESG and green energy (average trading volume in Europe in 2018/19 up by more than 40% vs. 2017).

EU energy production from lignite



Source: ENTSOE, estimates by mBank

EU energy production from hard coal



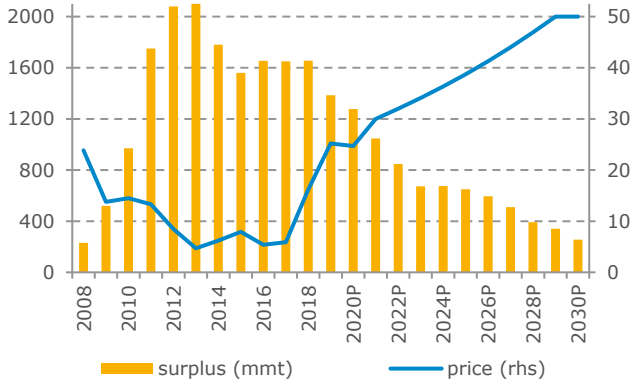
Source: ENTSOE, estimates by mBank

- **New ambitious emission reduction targets by 2030**: In line with earlier expectations, the Commission published a proposal to raise the emission reduction targets by 2030 from 40% to 55% (vs. 1990 baseline), Which matches the long-term climate-neutral objectives by 2050. Those initiatives will be supported by dedicated European funds and Green New Deal policies.

- More aggressive proposals have been voiced in the EU to reduce emissions by 60%, supported by a majority in the European Parliament. The final decision is with the Council, where radical measures are unlikely to be backed up (the 60% target passed by a slim majority in the Parliament and its Committees). The decisions should be made by mid-December and the ETS reform will be approved by mid-2021.

- **Reduction targets vs. ETS:**
  - **LRF:** Greater emission reduction ambitions will be mirrored by a higher Linear Reduction Factor (LRF) which determines how fast the available annual allowances pool is being cut. In the first phase by 2020, LRF was 1.7% (~38mn tonnes per year). The previous plan for 2021-30 set the LRF at 2.2% (~43mn tonnes), eliminating the entire pool by 2057. To reduce emissions by 55% in 2030, LRF would have to be raised to 3.7% (CAKE estimates) i.e. ~72mn tonnes, depleting the available allowances pool by 2042. The later LRF is revised, the steeper the supply reduction curve, which suggests that the ETS audit will be completed next year.
  - **Addition of new sectors to ETS:** The Commission has suggested to add (road and marine) transport, construction, and potentially also air transport to the Emissions Trading System. That scenario would generate additional demand for CO_2 allowances, which could boost prices depending on the adjustment of the supply pool.
  - **limitation/review of free allocations:** Free allocations totaled approx. 690mn tonnes in 2019, available among others in the heat sector, energy production (the allocation disappeared in 2020), and industries at the risk of carbon leakage. According to the ECA recommendations approved by the Commission, the free allowances allocation mechanism will be adjusted with a view to climate neutrality goals. As a result, the availability of free allocations may be limited, similar to the list of eligible sectors, which could also boost CO_2 prices.
  - **MSR:** According to the current scheme, the Market Stability Reserve will in the coming years continue to take surplus CO_2 off the market (24% of surplus over 833mn tonnes). The MSR register currently covers 1.3 billion tonnes of allowances, which may rise to 2.4 billion tonnes by 2023 according to our estimates. Theoretically, with a high LRF in the second half of Phase 4 (2025-30), the surplus may drop under 400mn tonnes, enabling a reverse transfer of 100mn tonnes of MSR allowances to stabilize prices. However, permanent cancellation of MSR allowances exceeding last year's auction pool will start in 2023 (the average annual auction pool will amount to 830-880mn tonnes in 2021-30). From 2024, any surplus of EUAs in the MSR over the previous year's total auction volume will be permanently cancelled. Consequently, MSR has a limited capacity to slow down the rise in CO_2prices in view of the rising shortfall of emissions.
  - **CO_2 prices:** The paper which accompanies the Commission proposal presents several different scenarios of reaching the new increased reduction targets and simulations of CO_2 prices by 2030. Depending on the approach (addition of new sectors to ETS, RES targets, energy efficiency, LRF), implied prices range from €32/t to €65 (Commission projection).
  - According to a KOBIZE report published early this year, an increase of the reduction targets to 55% by 2030 may boost prices up to €76/t (€52 at a 50% reduction target). According to BloombergNEF, prices will rise above €70 /t. Morgan Stanley has recently published an aggressive trajectory of rising prices of allowances (2021-30 forward curve up by 55%, projected €90/t in 2030).
- **Our current outlook:** We are upgrading our recent CO_2 price estimates for 2030 from €24/t to €50/t to be reached along a linear trajectory during Phase 4 (2021-30). During the previous ETS reform (see figure below), the market quickly discounted the planned changes even though their implementation and the actual reduction of surplus allowances took place later.

Projection of future CO_2 prices (EUR/t) and surplus volumes (million EUA)



Source: Bloomberg, European Commission, mBank estimates

Capacity Market

The table below presents the results of the main auctions on the capacity market which will open early next year.

Average annual **support for the sector will reach PLN 5bn in the coming years** but payments for coal-fired units will be discontinued in 2025 in line with the Winter Package (excluding multi-annual contracts). Note that the **payments may be put on hold due to the pending application of Tempus Energy** against the Commission (alleged formal errors in the notification of the Polish capacity market including insufficiently long consultation

period, discrimination against DSR). If the Court of Justice rules in favor of the applicant (the decision may be passed in December), capacity payments may be suspended until the Commission removes the legal defects. This has happened before in the UK, where the capacity market was frozen for almost a year. In theory, the UK case was more difficult for the Commission, but given the current pandemic, it is hard to know how long the additional notification procedure would take. It is not clear whether capacity fees charged to clients (~45 PLN/MWh) would be put on hold, like in the UK, or whether they would be deposited in escrow until the matter is settled (otherwise, clients would pay double fees in the following year, an unacceptable option from the social perspective).

Capacity auction results 2021-24

year	price*	contracts (MW)			total	incl. DSR
		1Y	5-7Y	15Y		
2021	240.3	9,969	8,330	4,128	22,427	620
2022	198.0	10,455	125	0	10,580	750
2023	203.0	9,778	0	853	10,631	791
2024	259.9	3,032	4,198	1,440	8,671	1,029

*PLN 1,000/MW/year
Source: PSE,mBank

Poland's RES Industry

Green Certificate Scheme

The RES support scheme based on the allocation of green certificates was discontinued at the end of 2015. Certificates of origin have since been issued only for systems commissioned before 1 July 2016. As the scheme spans 15 years, it will expire altogether at the end of July 2031. The scheme framework and key parameters are described below.

- **Demand for certificates**: Energy traders are required to cancel green certificates which confirm the share of green energy in their sales. The thresholds are set annually in a regulation of the Minister for Energy. The requirement was 19.5% in 2020 (plus 0.5% for biogas energy) and proposed at the same level for 2021. The Ministry may want to adjust the threshold for 2022. Considering the volumes of energy supply to end consumers and the applicable waivers, this year's demand for green energy may reach approx. 23 TWh.
- **Supply of certificates:** In view of RES production volumes and adjustment factors (limited support for co-combustion and hydro), annual supply of certificates of origin excluding biogas stands at approx. 19 TWh. It will be falling in the coming years as 15-year support periods for different systems gradually expire (the scheme opened in 2005).
- **Market source:** According to PSEW estimates, the oversupply of green certificates was approx. 21.8 TWh at the end of May, which suggests that the legislative amendments imposed in 2018 (higher RES requirements, practical ban for non-compliant operators using replacement payments in lieu of certificates) reduced the surplus by more than 3 TWh. The trend should continue (the oversupply may stand at ~15 TWh at 2021 YE) unless the government decides to overly reduce the statutory RES requirement (industry organizations are advocating for the 19.5% requirement to be maintained in 2022).
- **Green certificate prices:** Energy certificates of origin in the Polish market are currently trading in around PLN 140/MWh. This year's theoretical cap imposed by law is PLN 300/MWh (replacement fee, currently unavailable, set at 125% of the average price of certificates in the previous year).

  We expect prices to rise along a linear trajectory, in line with the expected reduction of the oversupply of certificates in the coming years, to PLN 200/MWh in 2026 (based on our energy price trajectory, certificate prices exceeding PLN 200 would imply excessive support for systems covered by the scheme, leading to legislative adjustments), and to remain at that level until the system finally expires in 2030.

Green certificate prices (PLN/MWh)

Source: TGE, mBank

Auction System

The RES auction system was introduced by law in February 2015. The first auction was held in 2016. RES are supported by means of competitive "pay-as-you-bid" auctions in several baskets. The volumes of contracted capacity per technology and the maximum reference prices are set by the Minister for Energy. Support is granted for a period of 15 years. Auction winners are eligible to build a PV farm in 24 months or a wind farm in 33 months. The scheme is funded with RES fees paid by energy consumers. The existing auction system is subject to a Commission notification valid until 2021 but the Ministry for Climate Change is working to extend it on the same terms until the end of June 2026.

- **2018 and 2019 auctions:** 1.15 GW of wind farm capacity and 514 MW of PV capacity was contracted in 2018 vs. 2.2 GW and 792 MW, respectively, in 2019. Wind farm projects contracted in 2019 offered prices at PLN 163-233/MWh (average price was PLN 208), and PV projects were priced at PLN 269-327 /MWh (average price was PLN 317, down by PLN 35 YoY).
- **2020 auction parameters:** The government wants to contract 75 TWh in all baskets at auctions scheduled in November and December 2020, mainly to small and large wind and PV systems. The reference price per MWh is set at PLN 250 for wind >1 MW, PLN 360 for small PV, and PLN 340 for large PV. Contracts are expected to cover approx. 0.8-1.0 GW wind and 1.5 GW PV. The current pipeline of projects ready for auction (connection conditions and construction permits in place) is approx. 1.2 GW wind and 2.5 GW PV. With that degree of competition, average prices at auction this year may be approx. 5-10% lower.
- **2021 auction parameters:** According to the published draft regulation, the planned volumes are approx. 0.3 GW wind and 1.7 GW PV.

PPA Model

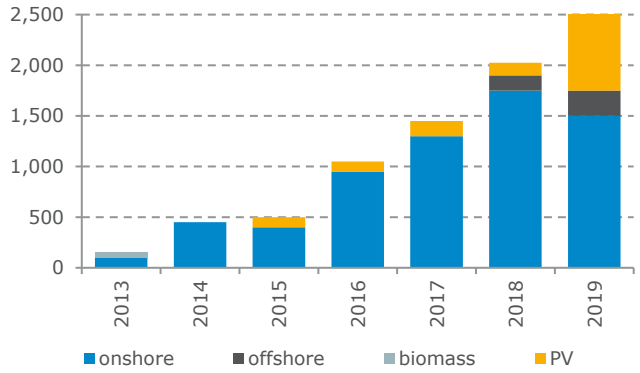
Renewable energy sources are also developing outside the government support scheme, both in connection with the falling LCEO (prices at the 2019 wind auction are 15% below the current wholesale price) and in view of increasingly popular Power Purchase Agreements (PPA).

In PPAs, corporate customers buy energy directly from producers under long-term contracts. Potential benefits include **optimized profile costs, hedged energy prices, and lower distribution fees** (for direct lines). It is also a convenient way to achieve corporate climate goals and to implement ESG strategies.

PPAs are part of the Commission's energy policy, which requires Member States to support PPAs in integrated energy and climate plans. PPAs in Poland are very new and at risk of pending litigation (energy and green certificates purchase) between wind farms and State-owned energy conglomerates which have unilaterally terminated such contracts (declaring them to be null and void).

The market potential is hard to quantify at this time and the official models under the Energy Policy and the National Energy and Climate Plan ignore that segment altogether. PPAs may become more attractive when a capacity fee is imposed as of next year.

RES capacity contracted under PPAs in Europe by year (MW)



Source: Wind Energy

More than 8 GW RES capacities are available under PPAs in the EU and the **trend is sharply rising**: over 44% of all PPAs were signed in 2019 (~30% volume-weighted).

The main customers under PPAs include heavy industry and consumer goods (each signed ~3GW PPAs so far).

RES contracted under PPAs mainly include wind farms but PV projects already accounted for approx. 30% in 2019.

Major PPAs in Poland include a **10Y PPA between Signify and the Kisielice wind farm** (40 MW) and a **10Y PPA between Kompania Piwowarska and an Innogy wind farm** (73 MW). However, this project finance model suffers some limitations including **counterparty risk, more expensive financing, and the risk of a long hedging period for the customer.**

Support for Prosumers

The prosumer segment has been on the rise in the past year, mainly driven by rooftop PV systems. Its key regulations and statistics are described below.

- **Support scheme:** The scheme covers systems up to 50 kW (including businesses since mid-2019). There is no requirement to hold a construction permit or a license, and no connection fee is charged. The current support scheme for prosumers spans 15 years from launch (up to 2039), offers a simplified connection track (notification), the option of exporting the surplus to the grid and the take-up of energy in the next 12 months at an adjusting factor of 0.8x for systems up to 10 kW and 0.7x for systems up to 50 kW (net metering) with a 0.6x option for energy co-operatives. Households are eligible for a tax credit (the CAPEX is deducible from the tax base) and "Mój prąd" scheme grants (PLN 1bn in total dedicated to 200k systems with a total capacity of ~1000 MW; 130k applications have been filed to date for 730 MW in aggregate).
- **Installed capacity:** The installed capacity of micro-systems (mainly prosumers) totaled approx. 1.7 GW (260k systems) as at the end of June 2020 and may rise to 2.4 GW by the year's end (mainly PV: 360k systems), vs. only 353 MW at 2018 YE and approx. 1 GW at 2019 YE (155k systems).
- **Payoff profile:** A typical 5 kW rooftop PV system costs PLN 28k (annual output 4.8 MWh, direct consumption 40%, total consumption 4.5 MWh); including tax credit and a PLN 5k "Mój prąd" grant, the NPV is approx. PLN 10.5k and the payoff period is ~7 years. Net of grants (if the scheme budget is not raised), the payoff period is 1 year longer; however, the energy price is a key factor (a capacity fee of ~PLN 45/MWh will be imposed next year, increasing the cost for the consumer by approx. PLN 20/MWh net of energy price cuts). In addition to the payoff profile, the development of prosumer systems is also driven by intensive marketing by system vendors.
- **Legislative amendments:** According to the timeline, RED II (non-discriminatory procedures for prosumers, peer-to-peer transactions, virtual prosumer option) should be implemented in Polish law by June 2021. A new amendment of the RES Act is in the drafting, expected to include: (a) **an adjustment of net metering coefficients** (different approach to distribution fee discounts) and an additional fixed distribution fee based on the inverter capacity for prosumers with low own consumption (virtual storage causes unfair distribution of costs among clients); (b) **extension of the support period to 25 years** and elimination of the time bar in 2039; and (c) **a new concept of virtual prosumer up to 500 kW** (mainly housing co-operatives and office buildings) where multiple prosumers share a single RES project under a contract. While still in drafting, those regulations should be finalized by the year's end.

Onshore Wind Farms

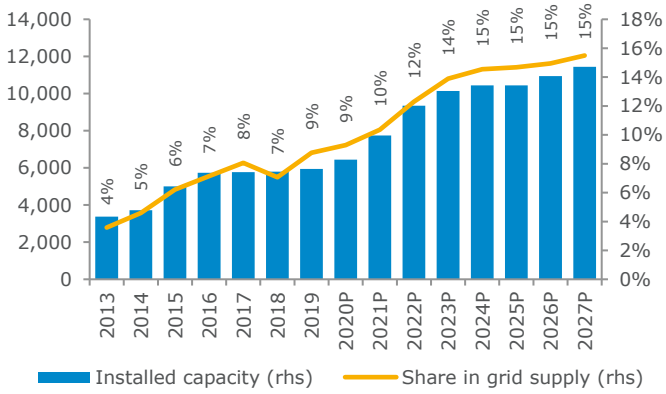
The installed capacity of onshore wind farms in Poland is 6.3 GW, the majority developed under the green certificate support scheme. After a period of stagnation, new 2018/19 RES auctions once again bolstered investments in the segment (3.4 GW projects are under implementation).

- **Project pipeline**: Wind farms with an aggregate capacity of 1.2 GW have connection agreements and construction permits in place; another 4.6 GW wind farms have connection agreements and/or connection conditions in place. Including investment projects

following the 2018/19 auctions, another 2.4 GW (1.2 GW with construction permits) may potentially compete for government support at upcoming auctions.

- **Distance regulations**: The Ministry for Economic Development has presented the framework of a new law which will liberalize the 2016 distance requirements under which wind farms cannot be situated closer than 10 times the mast length from residential buildings (~1.5-1.8 km). Under the new provisions, the minimum distance could be cut by municipalities to 0.5 km. The legal amendment (potentially by the year's end) would release a project pipeline of 0.5-1.0 GW. However, such projects would have to be redesigned from scratch in order to modify the technology (taller masts, bigger rotor, more powerful turbines), which requires the environmental impact procedure (1-2 years) as well as a connection agreement and a construction permit. New wind farms in this pool would thus come online in 2026. Note that the reorganization of the Polish government could result in delays in the legislative process (the amendments were sponsored by Jadwiga Emilewicz who no longer leads the Ministry for Economic Development).
- **Re-powering:** The green certificate scheme opened in 2005 and the first farms under the scheme were put in place as of 2007. Approximately 5 GW capacities will leave the "old" support scheme by 2030. Some projects may consider re-powering i.e. upgrading the capacity of systems with new available technology (2x more powerful turbines with a higher load factor). If only one-third of all operators decide to do so, wind capacity in Poland will increase by another 1.6-1.7 GW.
- **Polish capacity increase scenario**: In our market model, installed capacity will reach 10.4 GW in 2024 only due to 2018/12 auction winners. Annual production will reach 23 TWh in that time horizon, representing approx. 15% of Poland's total generation. Projects released by the liberalization of the 10H restriction (1 GW) will additionally come online in later years (2026/27). The wind farm fleet may continue to grow after the distance restrictions are lifted and once the PPA formula becomes more popular. Re-powering is really a matter of the next decade.

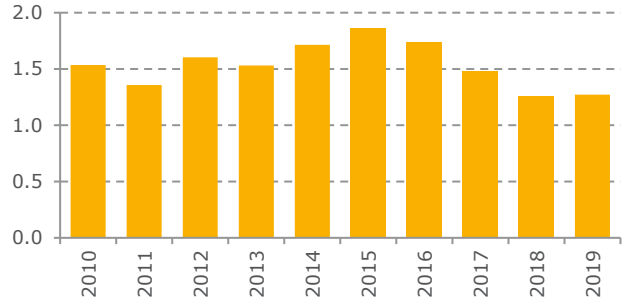
Projected onshore installed capacity in Poland (MW) vs. share in Poland's energy production



Source: PSE, mBank estimates

- **Model financial parameters**: According to Wind Europe, the unit CAPEX of onshore wind farm projects is approx. €1.3m/MW. According to IEO, the budget of such projects in Poland is approx. PLN 6.1m/MW, which is close to the European benchmark. Annual OPEX range from PLN 0.08 to 0.09mn/MW. The average load factor of onshore wind farms in Poland was approx. 26% in the last five years.

Average CAPEX (EUR m/MW) of financed EU online wind farm projects



Source: Wind Energy

- **NPV sensitivity analysis of a typical project:** Below is a sensitivity analysis for a 100 MW project at LTV of 75% and the bank's credit margin of (Load factor 30%). The inflation indexation of auction prices is 2% and the risk-free rate is 1.5%. In the baseline scenario, the NPV of a PLN 600mn investment project is PLN 96mn and its IRR is ~7.3%.

NPV and IRR sensitivity analysis for a 100 MW project

NPV	auction price (PLN/MWh)				
CAPEX (PLN mn/MW)	190	200	210	220	230
5.4	155	183	211	239	267
5.7	129	157	185	213	241
6.0	104	132	**160**	188	216
6.3	78	106	134	162	190
6.6	52	80	108	136	165

IRR	auction price (PLN/MWh)				
CAPEX (PLN mn/MW)	190	200	210	220	230
5.4	7.4%	8.3%	9.2%	10.2%	11.1%
5.7	6.6%	7.4%	8.2%	9.1%	10.0%
6.0	5.8%	6.5%	**7.3%**	8.2%	9.0%
6.3	5.0%	5.8%	6.5%	7.3%	8.1%
6.6	4.4%	5.1%	5.8%	6.5%	7.3%

Source: mBank estimates

Offshore Wind Farms

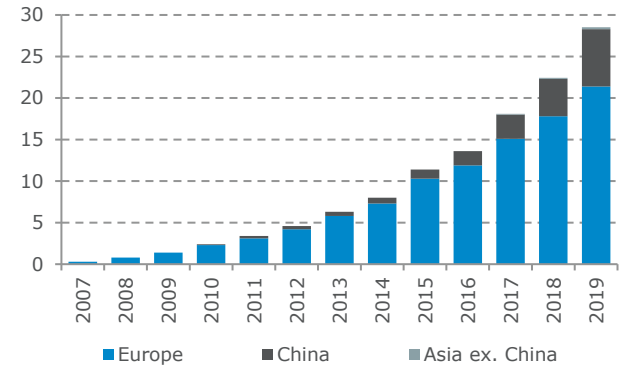
Europe/World

- **Status quo:** Record-high 6.1 GW of new offshore wind farms came online in 2019. The global capacity is now ~30 GW.

  Europe remains the biggest offshore market (75% of total capacity) as it started to develop large projects in 2006. The UK is the leader with a capacity of 10 GW. Other key players include Germany (7.4 GW), Denmark (1.7 GW), Belgium (1.6 GW), and the Netherlands (1.1 GW).

  China has recently joined the global leaders with ~7 GW installed capacity at 2019 YE.

Installed offshore wind capacity in Europe and Asia (GW)

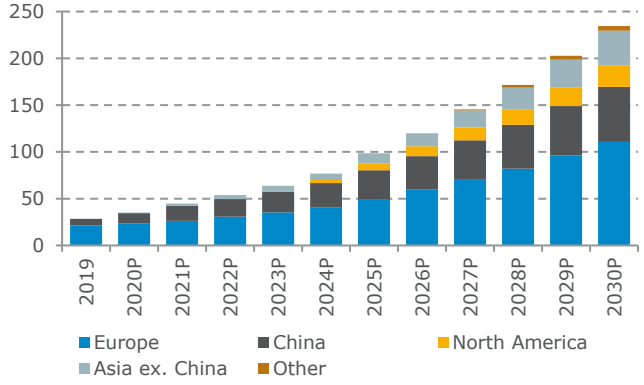


Source: GWEC

- **Capacity increase projection:** According to GWEC projections based mainly on government support schemes, the **CAGR 5Y offshore installed capacity is 18%**; the total capacity of offshore wind farms will reach >230 GW in 2030 (vs. 623 GW of global onshore wind farm capacity).

  The biggest increase is expected in Europe (according to the offshore roadmap currently under consultation, the share of offshore in energy production may rise to 35% in 2050) and in China but the **technology is already booming in the USA, Taiwan, South Korea, and Japan**.

Projected wind capacity expansion to 2030 (GW)

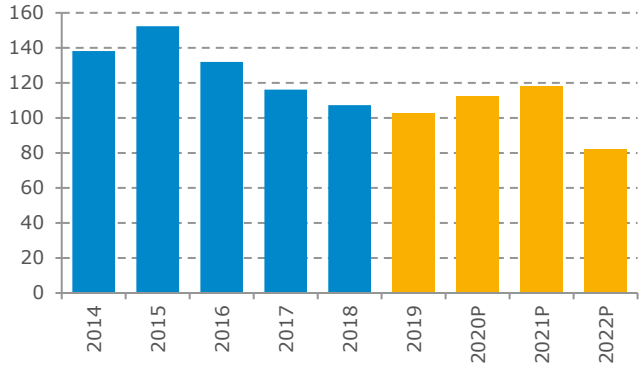


Source: GWEC

- **Falling LCOE:** Given the offshore CAPEX, the technology could only develop under support schemes which provided investors with adequate returns thanks to feed-in tariffs and feed-in premiums. However, **technological progress** (more powerful turbines, greater distance from the shore, higher load factor), the **economies of scale** (development of service, production, and transmission infrastructure), and **falling interest rates are steadily squeezing the LCOE** of offshore wind farms (levelized cost of energy including CAPEX, OPEX, and production volumes over the lifetime of a generating unit).

  The figure below presents the weighted average LCOE globally (since 2015 when the 3 GW mark was crossed) for systems commissioned each year. According to figures from completed auctions for systems to be commissioned in the coming years, the **unit energy cost of offshore projects will drop by another 30% in the next five years**. For example, a recent concession round in the UK for **5.5 GW to be delivered as of 2025 closed at a price of €46 /MWh** (very close to the current market energy price in Europe) vs. €81/MWh contracted for farms commissioned in 2021/22. Recent auctions in Germany and France, respectively for 1.6 GW and 0.6 GW projects, closed at similar parameters. Interestingly, auctions in the Netherlands and in Germany closed at zero-subsidy bids. However, when comparing LCOE from country to country, one should consider their regulatory specificity (distribution of risks between the investor and the public operator, participation in connection costs, etc.).

LCOE of offshore wind technology in projects completed during each year (EUR/MWh)

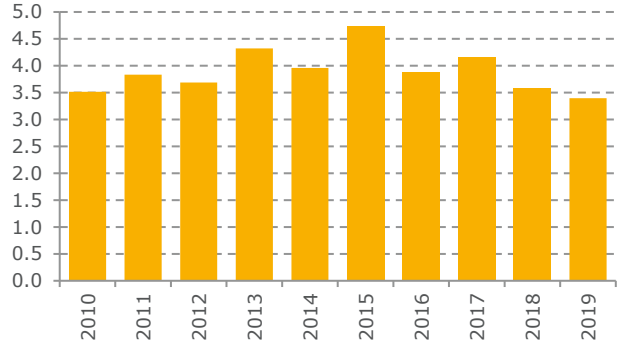


Source: IRENA

- **CAPEX/MW:** The LCOE downtrend is largely driven by falling unit CAPEX (on average €**3.4mn /MW** vs. €4.5m in 2015) owing among others to **progress in turbine power**.

  The average turbine power of planned projects was 2.7 MW in 2010 vs. > 7 MW now. The unit turbine power of projects to be commissioned in 2024/25 is expected to range from 10 to 12 MW (12 MW turbines were tested by GE last year). 15 MW Siemens Gamesa turbines will be launched commercially in 2024.

Offshore wind farm CAPEX (EUR mn/MW)

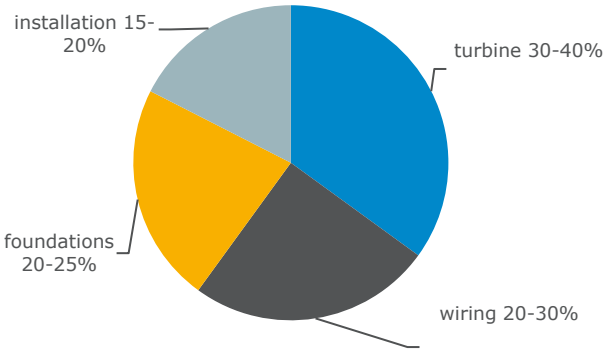


Source: IRENA

Besides turbines, which account for 30-40% of total CAPEX, **cables** contribute a large proportion of the CAPEX, depending on the distance from the shore and on the transmission infrastructure (availability of transmission lines, the requirement to pay for 100% of the onshore station connection). The latter factor depends on regulatory conditions (e.g. the connection is paid by the investor in the UK and by the national transmission line operator in Denmark). In turn, the **distance from the shore is steadily rising** (in search for new concessions and stronger winds), which has obviously inflated CAPEX in the past years (according to WindEurope, the distance of wind farms from the shore has increased from 10 km in 2010 to 30-50 km now).

Likewise, **foundations** farther off the shore require more capex due to sea depth (up from 15 m in 2010 to over 30 m in 2019).

Offshore CAPEX by category



Source: IEA, BNEF, IRENA

Considering the foregoing, **it is hard to compare CAPEX from farm to farm** as each project has its specificity. For instance, projects commissioned in Europe in 2019 included projects below the CAPEX benchmark (383 MW Fryslan in the Netherlands, CAPEX 2mn EUR/MW) and projects well above the benchmark (480 MW Saint-Nazaire in France, €5mn/MW). Interestingly, the average CAPEX of large European projects commissioned in 2018 was only €2.3mn/MW.

- **Decommissioning provisions:** Offshore farm liquidation and disposal costs are a new topic but the early experience helps to estimate the potential cost level. According to the UK Department for Business, Energy and Industrial Strategy (BEIS) and the design company Arup, the cost is **€0.18-0.4mn/MW**, depending on the distance to the shore and the sea depth.

Offshore Wind in Poland

The new draft law on support for offshore wind energy was published in July, will be tabled in Parliament soon, and it is on track to take effect by the year's end. The scheme framework and key parameters are described below.

- **Phase 1:** Support in the form of feed-in premiums for capacities up to GW, the call for applications open until the end of March 2021 (eligibility depends on the order of lodging applications), ERA decision by the end of June 2021. As a non-competitive scheme, it must be notified to the Commission at each time. Production must start within 7 years after the application is approved. The price used to settle negative balances will be set in a regulation of the Minister for Energy. The support scheme will be funded with RES fees.
- **Phase 2:** Competitive auctions scheduled in 2025 and 2027, each for 2.5 GW capacities.
- **Support scheme period:** 25 years or 100,000 MW (load factor 45%).
- **Taxes and collateral:** PLN 23k/MW per year (no real estate tax), investors who get the feed-in premium are required to set up collateral against the connection project at PLN 60/kW i.e. PLN 60mn for a 1 GW project.
- **Additional requirements:** Equipment must be manufactured no earlier than 72 months before production starts; local content requirements; the investor pays for the connection and PSE has the right of first refusal.
- **Support level:** The annex to the law includes support level targets per year along with market price projections, which imply **reference support payments at ~€86/MWh.**
- **List of projects:** The full list of projects with artificial island concessions is presented below. Only projects which may be implemented before 2030 are eligible for support in **Phase 1**. According to the Ministry for Climate Change, these include **two Polenergia projects (MFW Bałtyk II and III), two PGE projects, one PKN Orlen project, one RWE project, and potentially EDPR projects**. More remote locations may require cross-border arrangements. Consequently, the other farms on the list below will not be eligible for feed-in premiums. The last two concessions have not been paid and may be returned to the Ministry for Maritime Economy.
- **Polish offshore potential:** According to the government's estimates, the development potential of Polish Baltic offshore wind farms is 9.6 GW in the baseline scenario and approx. 11 GW in the best-case scenario by 2030, based on the planned transmission grid.

List of existing offshore concessions in Poland and implementation status

Project	Concession capacity	Environmental decision	Sea bottom study	Connection conditions	Connection agreement
Polenergia/Equinor MFW Bałtyk II and MFW Bałtyk III	2x 1.2 GW	yes	yes	1.44 GW	1.2 GW
PGE/Orsted Baltica 3	1.0 GW	yes	pending	1.0 GW	1.0 GW
PGE/Orsted Baltica 2	1.5 GW	yes	pending	1.5 GW	pending
PKN Orlen Baltic Power	1.2 GW	pending	yes	1.2 GW	pending
RWE FEW Baltic-2	0.35 GW	pending	pending	0.35 GW	pending
EDPR B-Wind & C-Wind	0.4 GW	pending	pending	w trakcie	no
Polenergia/Equinor MFW Bałtyk I	1.56 GW	no	no	1.56 GW	pending
PGE Baltica 1	0.9 GW	no	no	0.9 GW	no
Baltex 2 Not paid	0.8 GW	no	no	no	no
Baltex 5 Not paid	1.5 GW	no	no	no	no

Source: Ministry for Climate Change

Solar Energy

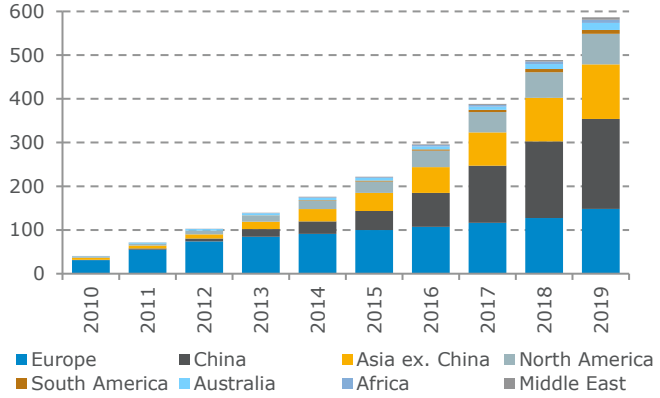
Europe/World

- **Status quo:** Approx. 100 GW new PV capacity was added in 2019. The global capacity is now ~600 GW (580-630 GW depending on the data source).

  China remains the biggest PV market (35% of the total capacity) even though its growth rate has recently slowed down with adjustments to the support scheme (competitive auctions have replaced feed-in tariffs).

  The other leaders by installed capacity include the USA (76 GW), Japan (61 GW), Germany (49 GW), and India (43 GW). Solar energy production reached over 700 TWh in 2019, accounting for ~3% of total energy generation (8-9% in Germany, Japan, and India).

Installed photovoltaic capacity in the world (GW)



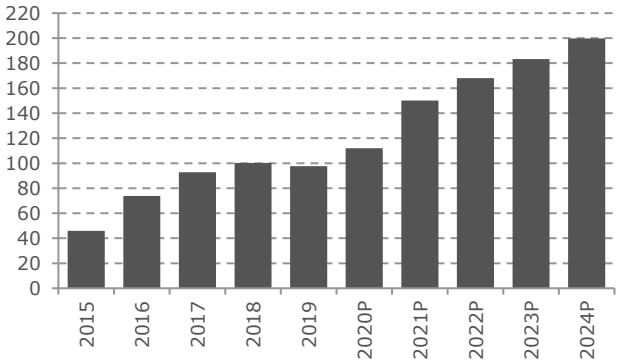
Source: BP, IRENA, BNEF, IHS

- According to SolarPower Europe projections (based among others on estimates of national organizations of PV investors), **the PV capacity CAGR 5Y may reach ~20%** (moderate scenario) and if so, the global capacity will double by 2023. In 2020, due to COVID-19 (supply chain and project implementation disruptions), the growth will be less strong than expected several months ago (90-115 GW vs. +140 GW).

  The biggest nominal increase will once again come from China while growth in the USA is expected to step up (with a significant contribution of PPAs: ~9 GW PPAs were signed in 2019), India, Spain (besides auctions, the boost comes from increasingly popular PPAs and prosumer systems after the lifting of the "solar tax"), the Netherlands, France, and Australia.

  Approx. 65-70% of the global increase is generated by large industrial/energy ground-based projects and 30-35% by prosumer rooftop systems. **Rooftop prosumer systems are still in the lead in Europe**, accounting for 66% of installed capacity (households ~19%, commercial consumers 30%, industry 17%) while large-scale ground-based projects represent approx. 34%.

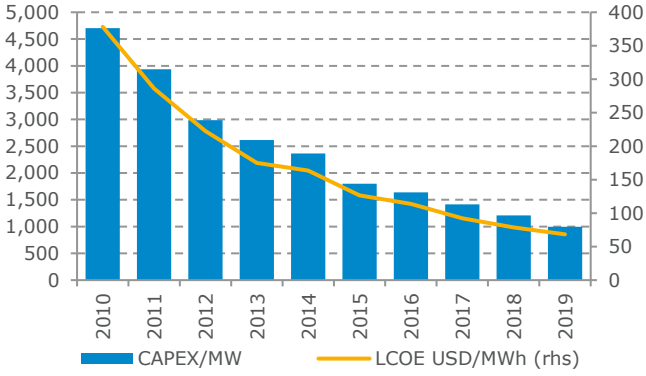
Projected PV capacity increase to 2024 (GW)



Source: SolarEnergy Europe

- **Falling LCOE:** Similar to other RES, the LCOE of photovoltaics has also dropped in the past few years but the benchmarks must be considered from the perspective of the geographic location of systems (the load factor may range from 10 to 30% depending on sunlight levels, the global average being 15-18%) and the scale of each project (the economics are very different for prosumer rooftop systems and large-scale projects >50 MW). According to IRENA, the **LCOE of large systems has dropped by more than 80% in the last 10 years** (including financing costs) and the trend continues (-13% in 2019). Depending on location, LCOE in Western Europe ranges from €25 /MWh (large systems in Spain and Italy) to €70 (~1MW projects in Northern Europe). Europe already has its first large-scale projects implemented without support (180 MW EnBW project in Germany) or under PPAs (175 MW BayWa r.e. project in Spain, 708 MW PV portfolio in Spain and Portugal).

Global average LCOE and CAPEX/MW of large PV projects (USD)

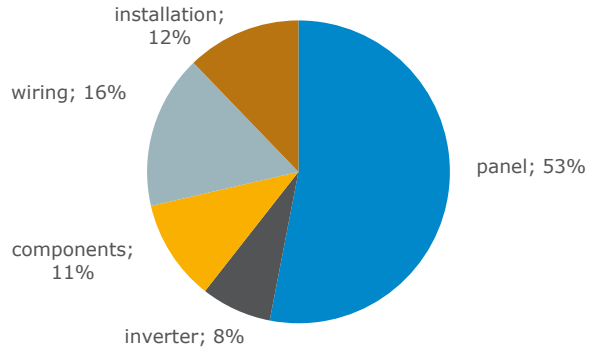


Source: IRENA

- **CAPEX/MW:** The LCOE downtrend is largely driven by falling unit CAPEX due among others to the optimisation of module production costs and technological progress (panels which adapt to sunlight intensity) resulting in higher productivity (average load factor up from 14% to 18% in 10 years).

  The average CAPEX in Europe ranges from €0.4-0.5m/MW for large industrial systems, from €0.7-0.75m for <1 MW projects, and from €1.0-1.1mn for household prosumer systems. According to ETIP PV, CAPEX should drop on average 20% by 2025 and 30% by 2030. This year's BNEF reports corroborate the projection (module cost down by ~10% in 1H 2020).

Industrial PV CAPEX by category



Source: IRENA

The breakdown of CAPEX by PV system component is presented in the figure above. PV modules account for the vast majority of the total CAPEX (53%) while they are also undergoing the fastest technological progress. The cost of other components is falling less fast, mainly driven by the economies of scale.

- **Future challenges:** PV technology is developing very fast, supported by government policy in most European countries, and yet it faces looming challenges which may stymie its growth:
  - **Cannibalization:** the growing share of PV in the energy mix is affecting energy prices (especially in South European countries), which undermines PV profitability and may discourage consumers from PPAs. Prosumer PV systems combined with storage may mitigate that risk.
  - **Inefficient infrastructure + restrictive connection policy**: The growing share of RES in the transmission grid and the distributed energy concept require investments in smart grids combined with solutions supporting grid flexibility (operator fee formulae must be reviewed). Unless the grid develops along those lines, connection conditions will have to be refused more frequently.

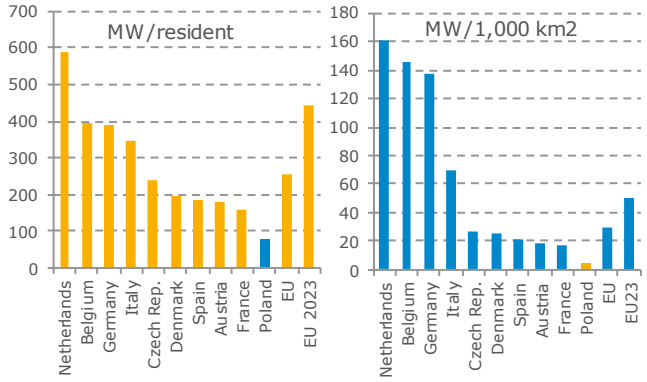
    Another option is to boost own consumption of household systems (e.g. adaptation of household appliances to the PV production profile). For instance, approx. 40% of prosumer micro-systems up to 10 kW to be developed in 2020 in Germany (~800 MW) will be equipped with storage functionalities (however, the profitability of projects in Germany is ensured by high EEG fees put on the electricity bill, which are not paid in the case of own consumption).
  - **Financing**: As the pool of government support at auctions is being depleted in certain countries, the burden of PV development shifts to PPAs, which are more difficult to finance due to counterparty risk.

Solar Energy Market in Poland

The total installed capacity of photovoltaics in Poland was 2.7 GW in early October 2020, double that reported at 2019 YE. The dynamic growth is mainly owed to household prosumer systems (driven by support schemes and sharply rising energy process in 2019, which boosted consumers' expectations looking forward) and the first projects implemented following RES contracts from auctions in the past years (1.7 GW contracted in 2017/19).

- **Project pipeline:** PV farms with total capacity of ~4 GW had connection conditions in place at 2019 YE, including 2.6 GW of <1MW projects. Approx. 0.9 GW had construction permits in place, which made them ready for auctions. However, smaller projects typically compile the full documentation only several weeks before an auction. As a result, projects at November and December auctions are bound to exceed the available volume of approx. 2.5 GW (connection conditions were granted for 1.2 GW in 1H 2020 alone). The Ministry for Climate Change wants to contract approx. 1.7 GW PV capacity at 2021 auctions.
- **Polish capacity increase scenario**: According to our market model, installed capacity will reach 6.9 GW in 2024 (production ~6 TWh equal to approx. 4% of total generation in Poland) with projects winning 2018/21 auctions and the first wave of prosumer projects. The following years will see a similar increase up to 12.9 GW in 2030 (exceeding the PEP40 target of 7.5 GW). However, the growth rate of prosumer systems may stay strong after the implementation of RED II owing to the activation of the virtual prosumer model. According to IEO estimates, the capacity will be more than 7 GW in 2024, nearly 8 GW in 2025 (including 4.2 GW prosumer capacity), and 13.9 GW in 2030 (including 5.4 GW prosumer capacity).

PV installed capacity in EU per capita and per area (plus SolarPower projection for EU by 2023)

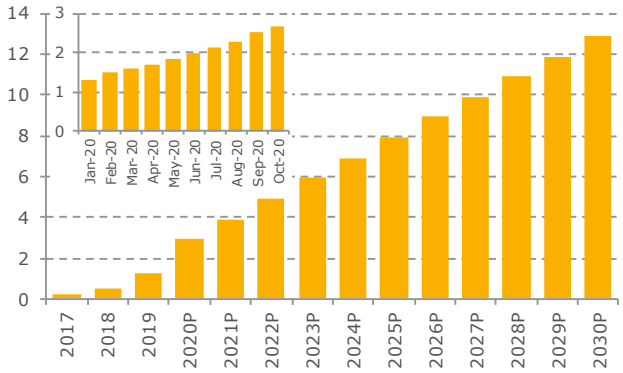


Source: SolarPower Europe, mBank estimates

As a reference point for the development of photovoltaics in Poland, let's consider scenarios of other EU Member States. An estimation of the potential of the Polish PV market based on the current EU indicators (capacity per population and capacity per area) implies 9-10 GW (~16GW including the 2023 projection). The capacity of Polish household prosumers alone based on the German market is estimated at 3.5-5 GW (bearing in mind that the price incentive in Germany flows from the high EEG fee put on the electricity bill).

As a reference point for the development of photovoltaics in Poland, let's consider scenarios of other EU Member States. An estimation of the potential of the Polish PV market based on the current EU indicators (capacity per population and capacity per area) implies 9-10 GW (~16GW including the 2023 projection). The capacity of Polish household prosumers alone based on the German market is estimated at 3.5-5 GW (bearing in mind that the price incentive in Germany flows from the high EEG fee put on the electricity bill).

Projection of PV capacity installations in Poland (GW)



Source: PSE, mBank estimates

- **Model financial parameters**: According to IEO, the capex of small prosumer projects in Poland is approx. PLN 5m/MW (i.e. close to the European benchmark of €1m/MW) and the capex of larger systems is approx. PLN 2.5-3.0m/MW (the European benchmark implies PLN 2.2m/MW). With further development of supply chains, technology, and competition, unit CAPEX is expected to drop in the coming years. IEO expects that the CAPEX will drop 20% by 2025, bringing LCOE down to approx. PLN 270/MWh for large systems. Annual OPEX is around PLN 0.1m/MW. The average load factor of Polish PV farms is approx. 10-11%.
- **NPV sensitivity analysis of a typical project**: Below is a sensitivity analysis of a 10 MW project with LTV at 65% and the bank's credit margin at 2.5%. The inflation indexation of auction prices is 2% and the risk-free rate is 1.5%. In the baseline scenario, the NPV of a PLN 27m investment project is PLN 7.8m and its IRR is ~8.4%.

NPV and IRR sensitivity analysis for a 10 MWp project

NPV	auction price (PLN/MWh)				
CAPEX PLN mn/MW	300	310	320	330	340
2.4	7.8	8.8	9.8	10.8	11.8
2.6	6.6	7.7	8.7	9.7	10.7
2.7	5.5	6.6	**7.6**	8.6	9.6
2.8	4.4	5.5	6.5	7.5	8.5
3.0	3.3	4.3	5.4	6.4	7.4

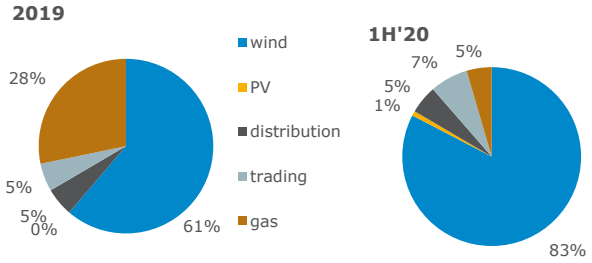
IRR	auction price (PLN/MWh)				
CAPEX PLN mn/MW	300	310	320	330	340
2.4	8.9%	9.6%	10.4%	11.1%	11.8%
2.6	7.9%	8.6%	9.3%	10.0%	10.7%
2.7	7.1%	7.7%	**8.4%**	9.1%	9.7%
2.8	6.3%	6.9%	7.5%	8.2%	8.8%
3.0	5.5%	6.1%	6.7%	7.4%	8.0%

Source: mBank estimates

Polenergia

Polenergia focuses on energy production from renewable sources, which currently generate more than 80% of its EBITDA. The Company has a broad portfolio of projects at different stages of development including wind (among others two offshore projects on the Baltic Sea) and photovoltaics. The Company is a regulated energy distributor and an active participant of the energy market through Polenergia Obrót (wholesale, portfolio management services, RES aggregation). The Group has a conventional energy business including two 124MW gas-fired units.

EBITDA breakdown, 2019 and 1H 2020

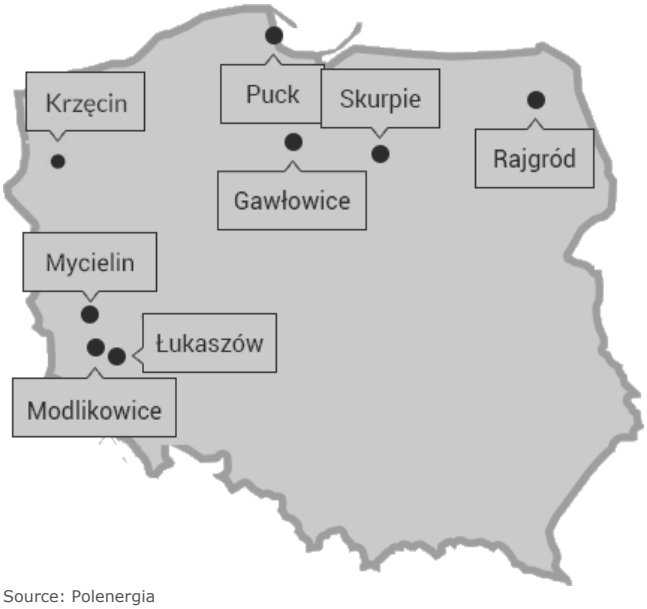


Source: Polenergia

Onshore Wind Farms

- **Farm portfolio:** Polenergia's production portfolio includes 8 farms with a total capacity of 249 MW. The assets are covered by the RES support scheme of green certificates, which will expire gradually, depending on the commissioning date of individual projects, by 2030 (22 MW in 2022, 6 MW in 2025, 58 MW in 2027, 74 MW in 2029 and 90 MW in 2030). The average load factor in the last four years was 32%.

Polenergia wind farm map



Source: Polenergia

- **Projects under development:** Polenergia won 15Y contracts at the 2019 auction for 186 MW projects including Szymankowo (38 MW), Dębsk (121 MW), and Kostomłoty (27 MW). The two former farms are under construction (Szymankowo since November 2019, Dębsk since July 2020), and the third project should

start in 1Q 2021. We expect that the projects will be commissioned in July 2021, May 2022, and September 2022, respectively. We estimate the average auction price of the projects at PLN 208/MWh (price not disclosed by the Company).

- **Advanced projects:** These include Piekło (13 MW with a construction permit), which will probably enter this year's auction. We estimate the settlement price of the project at PLN 200/MWh (2019 average was PLN 208). The Company has two other projects with a total capacity of 82 MW which will depend on the lifting of the 10H distance restrictions. We expect construction to start in 2022 at market prices outside the support scheme. We also expect new projects to start in the coming years with a total capacity of 50 MW per year (the Company's strategy sets a target of 300 MW).
- **Operating parameters:** Our model assumes a load factor of PV farms at 32% and OPEX at PLN 0.1m/MW (in line with 1H 2020 results, Sulechów I matches the benchmark). We also expect green certificate prices to increase to PLN 200/MWh by 2026 (see above) and energy prices to rise driven by CO_2.
- **Segment results projection:** Based on that project timeline, we expect that the Company will have a wind portfolio of 485 MW by 2024 (according to the strategic targets) and ~730 MW by 2029. The segment's 2020 EBITDA should reach PLN 230m, rising to PLN 350m in 2024 after the commissioning of new projects (exceeding the strategic target of PLN 280m mainly due to a more aggressive price trajectory) and to PLN 460m in 2029.
- **PPA litigation with Tauron:** Polenrgia is in litigation with Tauron's subsidiary (Polska Energia-Pierwsza Kompania Handlowa Sp. z o.o.) which terminated in 2015 energy and green certificate purchase agreements for Polenergia's farms Łukaszów and Modlikowice (58 MW in total). Polenergia's claims against PEPKH run up to PLN 115m. In a partial judgment, the court ruled that the termination was unlawful and that compensation is due in principle. An appeal is pending before a court of second instance. In 2018, Polenergia filed an action directly against Tauron claiming compensation of PLN 79m and liability for future losses at PLN 265m. **Those proceedings are likely to continue for several more years; it is hard to quantify the probability that the compensation will be awarded (not least because of the opposite party's legal status which hinders recourse to Tauron). The amount of compensation will depend on actual prices of energy and certificates of origin outside PPAs**. Our model disregards such payments.

Installed onshore wind capacity and contribution to EBITDA

(PLN m)	`18	`19	`20P	`21P	`22P	`23P	`24P
Capacity (MW)	**246**	**249**	**249**	**268**	**365**	**442**	**485**
Load factor	29%	34%	33%	31%	31%	31%	31%
Production (TWh)	0.6	0.7	0.7	0.7	1.0	1.2	1.3
Power (PLN/MWh)	167	239	267	235	254	257	264
Green certificate	99	132	140	149	158	167	178
EBITDA	**91**	**175**	**229**	**230**	**281**	**320**	**354**

Source: mBank estimates

Offshore Wind Project

- **Concessions**: The Company holds three concessions to build artificial islands in the Baltic Sea with a total capacity of 3 GW (MFW Bałtyk II and Bałtyk III at 1.4 GW and Bałtyk I at 1.6 GW). Equinor became a partner in those projects (50% interest) in 2018/19. The selling price was PLN 94mn and PLN 34mn, respectively. The agreements provide for payments contingent on partial completion and/or parameters but the details have not been disclosed. Equinor is responsible for several phases of development and will be the wind farm operator.
- **Location**: Bałtyk II and Bałtyk III in the Slupsk Bank (Ławica Słupska), 37km and 22km offshore; Bałtyk I in the Middle Bank (Ławica Środkowa), 80km offshore.
- **Timeline:** MFW Bałtyk II and Bałtyk III will enter the first phase of support; if contracts are awarded, the farms should start production in 2025. Investment decisions in Bałtyk I will be made at a later date depending on the results of the 2025 auction (or 2027 auction).
- **Financial assumptions**: The following sensitivity analysis for the NPV of Phase 1 (720 MW attr. to Polenerga) to per-MW CAPEX and guaranteed offtake prices assumes a load factor of 47% and fixed costs of PLN 0.25m/MW/year (vs. an EU benchmark of €50,000-60,000).
- **NPV model**: Assuming LTV of 70%, CAPEX of €3.05m/MW (4.3 EUR/PLN), and offtake price of PLN 350/MWh (5% below the 86 EUR/MWh expected as a consequence of regulation), the NPV is PLN 0.77bn, and IRR is 7.1%. As said, we do not include this project in our models for Polenergia due to potential financing solutions. We do include the book value of interests in offshore licenses, i.e. PLN 0.15bn.

NPV and IRR sensitivity analysis for a 720 MW project

NPV		CfD (PLN/MWh)				
		310	**330**	**350**	**370**	**390**
CAPEX (EUR m/MW)	**2.4**	1,322	1,765	2,209	2,652	3,096
	2.7	605	1,048	1,492	1,935	2,378
	3.1	-113	331	**774**	1,218	1,661
	3.4	-830	-387	57	500	944
	3.7	-1,547	-1,104	-661	-217	226

IRR		CfD (PLN/MWh)				
		310	**330**	**350**	**370**	**390**
CAPEX (EUR m/MW)	**2.4**	9.1%	10.6%	12.2%	13.9%	15.6%
	2.7	6.7%	8.0%	9.3%	10.7%	12.2%
	3.1	4.8%	5.9%	**7.1%**	8.3%	9.6%
	3.4	3.3%	4.2%	5.2%	6.3%	7.4%
	3.7	2.1%	2.9%	3.7%	4.6%	5.6%

Source: mBank estimates

Solar Energy

- **Farm portfolio:** Polenergia has one 8 MW solar energy plant up and running in Sulechów which won the 2018 RES auction (15Y feed-in premium contract). The Company has not disclosed the bid price but the average price at the 2018 auction was PLN 352/MWh (ranging from PLN 289 to 365/MWh).
- **Advanced projects:** 27 MW projects are RTB (ready to build), including 21 MW at Sulechów II and III which did not win the 2019 RES auction. Our model assumes that the projects will win contracts at the 2020 auction at an average price 10% higher than the 2019 auction price (PLN 285/MWh).
- **Projects at an early stage of development**: The Company has 238 MW project in preparation. Their implementation depends on support won at auctions. Our model estimates that 50 MW farms will be ready for auctions in 2021. We expect 30 MW per year to be ready to build in the coming years. We set auction prices (or PPA prices) at PLN 285/MWh and unit CAPEX at PLN 2.8m.
- **Operating parameters:** Our model assumes a load factor of PV farms at 12% and OPEX at 0.1mn PLN/MW (in line with 1H 2020 results, Sulechów I matches the benchmark). Auction winners are paid the difference between the bid price and the BASE spot benchmark, which implies a negative PV profile cost (we estimate that the positive impact on stand-alone revenues is 15 PLN/MWh, which is the average spread between BASE and the average hourly price from 8 a.m. to 6 p.m. in the last 12 months).
- **Segment results projection:** With that project timeline, we expect that the Company will have an 88 MW PV portfolio by 2024 (the Company's strategy sets a target of 90 MW) and ~240 MW by 2029. The 2020 EBITDA of Sulechów I should reach PLN 2.8mn and is expected to rise after the commissioning of new projects to PLN 22mn in 2024 (strategy target ~PLN 25mn) and PLN 58mn in 2029.

PV installed capacity and contribution to EBITDA

(PLN m)	'20P	'21P	'22P	'23P	'24P
Installed capacity (MW)	**8**	**8**	**8**	**38**	**88**
Load factor	14%	13%	13%	13%	13%
Production (TWh)	0.01	0.01	0.01	0.04	0.10
Price (PLN/MWh)	365	365	365	302	292
EBITDA	**3**	**3**	**3**	**10**	**22**

Source: mBank estimates

Distribution

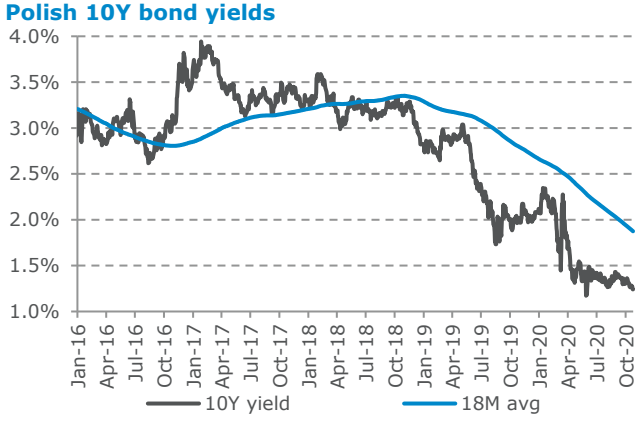
Polenergia's subsidiary Polenergia Dystrybucja is a regulated distributor. It is the biggest private energy distributor in Poland. Its **business model provides for the development of new distribution areas across Poland** (see map below). Its offer is mainly addressed to special economic zones, housing estate developers, as well as shopping mall, industrial park, office building and warehouse operators. Polenergia's grid has more than 11k customers and the transmission volumes are 0.3 TWh per year. **Apart from transmission, Polenergia offers energy sales** in its distribution areas. The segment also includes distribution of natural gas to industrial clients in Tomaszów Mazowiecki (~0.3 TWh per year) but the service only generates ~5% of the segment revenue.

Polenergia OSD distribution areas

Source: Polenergia

The distribution company operates under the **standard regulatory model** where ERA sets the network tariff and approves investment plans. Regulated revenue includes: return on regulated assets (RAVxWACC), eligible OPEX (including energy efficiency improvements), depreciation and amortization, taxes and charges, and network losses. In tariff calculations, the regulator considers DNOs' qualitative indicators in t-2 (SAIDI, SAIFI, time to connection) at a risk of penalty capped at 11% of ROE. ERA may award premiums at 3-5% of ROE (payable in 2027) to DNOs which attain the long-term target in 2025. The regulator may impose +/-10% expert ROE adjustments based on RV factor (evaluation of the DNO's innovation, mitigating the impact of natural disasters on qualitative indicators, etc.). RAV (Regulatory Asset Value) is updated on an annual basis depending on net investments while WACC is determined according to a formula based on the average Treasury bond yield in the last 18 months. **With falling interest rates in the last few years, WACC in DNOs' tariffs has steadily decreased**.

Polish 10Y bond yields



Source: Bloomberg

The biggest operators have been negotiating a change of the formula with ERA this year (including an extension of the period of calculation of the average RFR) but the regulator is very unlikely to be convinced. However, a **mechanism mitigating the impact of volumes on revenue** is likely to be put in the regulations. At this time,

the unit network fee is set depending on the total regulatory income and the projected distribution volume (for instance, if the actual volume is less than the ERA projection, the operator does not get the income). Such deviations from plan will now be fixed in t+2 tariffs.

Projected results of Polenergia's distribution business

(PLN m)	'17	'18	'19	'20P	'21P	'22P	'23P	'24P
RAV	**78**	**82**	**86**	**92**	**96**	**117**	**127**	**136**
WACC	5.6%	6.0%	6.0%	5.5%	4.5%	4.1%	4.4%	5.2%
RFR	2.9%	3.3%	3.3%	2.8%	1.9%	1.5%	1.8%	2.5%
EBITDA	**16**	**14**	**15**	**16**	**18**	**20**	**22**	**25**
Distribution	10	12	12	12	14	15	17	20
Sales	6	3	3	4	4	5	5	5

Source: Polenergia, P – mBank projection

Key Assumptions for Distribution Models

- **RAV:** The Regulatory Asset Value under the tariff in place to 30 June 2020 was PLN 92m; however, including existing capex (plans approved by ERA), RAV stood at PLN 121m at 30 June. At the tariff rates updated in October, RAV is PLN 109.6m. According to the Company's strategy, RAV should exceed PLN 150m in 2024. Our model reflects that and sets the OPEX CAGR 2020-29 at PLN 20m (including the cost of connections recognized in full in the profit of the period at PLN 2m).
- **WACC**: We expect that the current regulatory formula based on 18M average 10Y Treasury bond yield will stay in place. As a result, WACC will drop to 4.5% in 2021 vs. 5.5% in 2020. We use our macroeconomists' yield estimates for the following years and expect the risk-free rate to converge in the long term at 3.5% as per the DCF model.
- **Margin on sales of energy**: After weak margins in 2019 (PLN 0.9mn impact of Tariff G provisions), we expect that the margin will improve markedly and stay stable within the time horizon of the projection. With volumes rising pro rata to the expansion of the distribution network, the contribution to the segment's EBITDA will double, reaching PLN 5.2m in 2024.

Trading

The trading segment includes wholesale (domestic and international) of energy, property rights, gas, CO2 emission allowances, and guarantees of origin. The segment provides portfolio management services to Group members (gas and RES, total capacity 370 MW) and third-party clients (RES, total capacity 110 MW). The trading volume was 10.5 TWh electricity and 0.4 TWh gas in 2019 (due to unfavorable storage regulations, the business was very limited and mainly included portfolio balancing of Polenergia Dystrybucja's end customers). The Management's new strategy for 2020-24 provides for the development of new business lines (sale to end customers, proprietary trading, RES aggregation), which already made a contribution to EBITDA in 1H 2020. Below is a concise description of the segment's profit drivers and the assumptions of projections for the coming years.

- **Trading portfolio margin**: This line presents the Company's profit from wholesale (forward and spot, domestic and international), including securing of deliveries to Polenergia Dystrybucja's end customers. We expect that the unit margin will stay stable in the coming years while the volumes will rise pro rata to growth of the Polish energy market (after a sharp drop in 2020).
- **Wind farm energy portfolio margin**: Securing wind farm sales and production balancing. The profit (loss) of the line depends on the difference between projected and actual wind energy production and on deviations of the profile cost. In the mid-term, we expect that the loss will be proportionate to the production volume of proprietary wind farms.
- **Wind farm green certificates portfolio margin**: The segment secures sales of certificates of origin from the wind farm portfolio, and the margin is proportionate to the certificate price (which is our mid-term assumption), but strong price changes could generate deviations.
- **RES aggregation**: this is a newly-formed segment which encompasses portfolio management, profiling, and balancing services provided to independent RES firms. Polenergia is aiming to reach a 20% market share in this area. We assume that the role of RES aggregation as an EBITDA driver will grow in line with the growth of RES in the Polish market.
- **Sales to strategic clients**: another new line with an expected 2020 margin of ca. PLN 1m and assumed growth in average EBITDA of 5% over the longer term.
- **Other**: Other operations at Polenergia include hedging which is expected to being stable gains beyond 2020.
- **OPEX**: The line includes the segment's overheads (mainly salaries) and trading commissions. Following the launch of new business lines in 2020, OPEX increased sharply YoY (+PLN 2.2mn in 1H'20) but we expect that personnel costs will increase 2% per year while commissions remain linked closely to revenue in the coming years.

Projected results of Polenergia's trading business

(PLN m)	'17	'18	'19	'20P	'21P	'22P	'23P	'24P
EBITDA	**13**	**-16**	**15**	**22**	**15**	**15**	**16**	**17**
trading portfolio	14	-8	13	10	11	11	11	11
FV-energy portfolio	6	-4	-4	-1	-1	-1	-1	-2
FV-certif. portfolio	5	8	14	8	4	4	4	5
RES aggregation	0	0	0	6	7	8	9	10
strategic customers	0	0	0	1	1	1	1	1
other	-2	1	0	12	7	7	7	7
operating expenses	-11	-12	-8	-11	-11	-11	-12	-12

Source: Polenergia, P – mBank projection

Gas Energy

- **Assets:** The segment's key asset is the gas-fired CHP Nowa Sarzyna (116MWe and 70 MWt) which supplies technological heat to a Ciech plant (long-term agreement up to 2030). The Company also owns the power plant Mercury in Wałbrzych (8 MWe) fired with coke-oven gas from the local coke plant (coke supply and energy sale contract with the coke plant up to 2023). The segment's total production in 2019 was 0.75 TWh energy and 436 TJ heat.
- **Segment results:** The segment's results are driven mainly by the model CSS spread (energy price less the cost of gas and CO_2) and the settlement price of heat. The Company was also reimbursed for stranded costs in the last years (with only fractional payments at this time), which means that the 2020 results are not directly comparable YoY (EBITDA PLN 7mn and fractional stranded cost compensation at PLN 3mn in 1H 2020 vs. PLN 30mn and PLN 36mn, respectively, in 1H 2019). On the other hand, CHP Nowa Sarzyna will be generating income on the capacity market at >PLN 20 as of 2021 (109 MW capacity contract).

- **Planned development of cogeneration projects**: The Company's strategy includes investments with technology and industrial partners in new high-efficiency gas-fired CHP units ready for hydrogen in the long term. A memorandum of understanding was signed with Siemens Energy in line with the strategy. ENS pilot projects are in the pipeline. Polenergia wants to become a green hydrogen producer based on proprietary RES. The strategic target is to own 33% of a 300 MW CHP portfolio. The Company expects its gas-fired cogeneration capacity to increase from 124 MW to 246 MW in 2024 (the target is to own 33% of a 400 MW project portfolio).
- **Segment results projection:** Our projection of the segment's results in the coming years assumes no additional capacities (no project timeline or volume is available at this time). The EBITDA projection is only based on assumptions for energy prices and CSS (we expect that the current strategy of securing gas, energy, and CO2 prices will continue to be pursued). We add revenue from the capacity market, both within and beyond the time horizon of completed auctions (ENS meets the requirements of the Winter Package and is eligible for support also after July 2025). As such, our EBITDA projection is approx. PLN 19mn in 2020 (the YoY decrease is due to the absence of stranded cost compensation) and PLN 21mn in 2024 (different from the PLN 50mn target under the strategy, probably due to the absence of additional capacities in the model while the strategy expects to double the capacities).

Projected results of Polenergia's gas segment

(PLN m)	'18	'19	'20P	'21P	'22P	'23P	'24P
Energy (TWh)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Heat (PJ)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Power (PLN/MWh)	167	239	267	235	254	257	264
CSS (PLN/MWh)	-14	97	155	99	87	89	93
Gas (PLN/MWh)	95	64	40	53	65	65	65
EBITDA	**110**	**81**	**19**	**38**	**14**	**8**	**21**

Source: Polenergia, P – mBank projection

General Expenses and Other P&L Items

As part of a reportable operating segment called "Unallocated,", Polenergia books general operating costs (ca. PLN 10-11m a year) and profits earned from biomass and pellets (PLN 1.6m in 2019, expected to increase this year).

Polenergia has earmarked its subsidiary biomass producer, which delivers mostly to two power stations, for sale in a follow-up to the 2018 divestment of other biomass assets.

Further, Polenergia has a segment called "Purchase Price Allocation," where it amortizes the equity contribution on its merger with PEP (approximately PLN 10m a year through 2025).

In previous years the segmental presentations also included real estate (cost center at approximately. PLN 1m on EBITDA), but this has been absorbed by Wind Power and Photovoltaics.

YTD Financial Results of Polenergia vs. our FY2020 Estimates

Polenergia generated EBITDA of PLN 148m in H1 2020, a 16% increase year over year achieved despite lower PPA compensation (-PLN 33m y/y) and with no major one-time charges or boosts.

The EBITDA figure for the year to 30 June 2020 was equivalent to 53% of our forecast for the full FY2020, and in case of net profit the proportion was 61%, but in H2 Polenergia faces higher financing costs and tax.

- **Wind Segment**: EBITDA improved y/y thanks to better wind conditions (load factor +2 p.p.) and higher prices of electricity and COOs.
- **PV**: The 8 MW plant performed as expected amid good sunlight conditions.
- **Gas CHP**: Reduced PPA were partly offset by higher model CSS margins and sales volume (+11%)
- **Distribution**: Higher RAV included in tariff, lower network losses, improved sales margins.
- **Trading**: New business lines contributed PLN 2.2m y/y on top of higher margins, positive valuation adjustments, lower costs.

2020 H1 results vs. FY2020 mBank estimates

(PLN m)	1H'20	1H'19	y/y	2020P	YTD
Revenue	821.9	1,304.2	-37%	1,689.1	49%
(adj.) EBITDA	147.6	127.9	15%	276.2	53%
EBITDA	**147.6**	**127.7**	**16%**	**276.2**	**53%**
wind energy	127.3	93.5	36%	228.9	56%
PV	1.3	0.0	-	2.8	48%
gas CHP	7.0	29.8	-77%	18.8	37%
distribution	7.9	7.2	10%	16.0	49%
trading	10.6	5.9	79%	22.2	48%
other	-6.5	-8.7	-	-12.6	51%
EBIT	97.5	76.0	28%	173.5	56%
Financing activity	-20.0	-21.6	-7%	-42.9	47%
Net profit	64.4	45.6	41%	105.8	61%

Source: Polenergia, P – mBank projection

2020 Q3 Estimates

At close to PLN 53m, 2020 third-quarter EBITDA will most likely post a 28% decrease from the same period a year earlier led by reduced PPA compensation (-PLN 34m) and negative base effects for distribution. As of 30 September EBITDA will most likely fulfil 73% of our FY forecast.

- **Wind Segment**: Anticipating improvement in EBITDA despite worse wind conditions (load factor -3.6 pp on average for the market) and thanks to higher prices of electricity and COOs.
- **PV**: Better performance of the 8 MW solar plant thanks to seasonal patterns.
- **Gas CHP**: Reduced PPA should be partly offset by higher model CSS margins and sales volume (+20%).
- **Distribution**: Lower profit due to negative base effects (PLN 1.6m charge reversal recognized in Q3'19).
- **Trading**: New business lines set to contribute PLN 2.1m y/y, plus higher margins, positive valuation adjustments, lower costs.

2020 Q3 estimates vs. year-ago results

(PLN m)	3Q'20P	3Q'19	y/y	2020P	YTD
Revenue	405.6	643.4	-37%	1,689.1	73%
(adj.) EBITDA	52.6	72.6	-28%	276.2	73%
EBITDA	**52.6**	**72.6**	**-28%**	**276.2**	**73%**
wind energy	35.8	29.9	19%	228.9	71%
PV	1.3	0.0	-	2.8	94%
gas CHP	9.2	35.2	-74%	18.8	86%
distribution	3.6	5.5	-35%	16.0	71%
trading	6.0	3.3	83%	22.2	75%
other	-3.2	-1.3	-	-12.6	77%
EBIT	28.0	47.2	-41%	173.5	72%
Financing activity	-11.6	-10.9	6%	-42.9	74%
Net profit	13.3	29.0	-54%	105.8	73%

Source: Polenergia, P - mBank projection

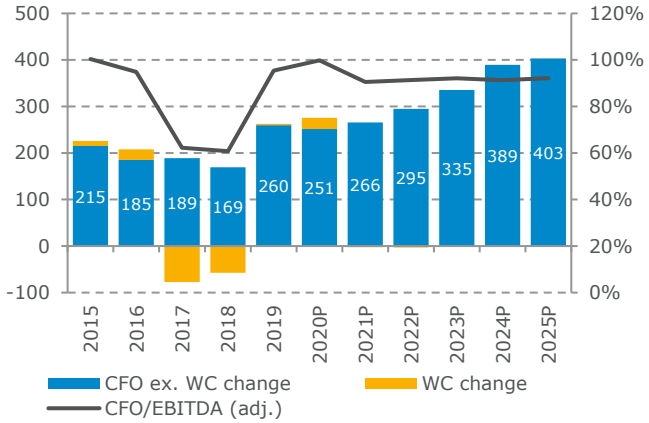
Cash Flow

In 2019 Polenergia generated cash flow from operations in the amount of PLN 263m, an equivalent of 94% of the year's adjusted EBITDA. Changes in working capital did not have much of an impact on OCF last year, unlike in the two years prior when it was heavily distorted by changes in the timing of PPA payments (via receivables) and adjustments to TGE margins.

In 2020 Polenergia could see positive working capital to the tune of PLN 25m based on changes introduced to the TGE margin rules and PLN 12m expected to be received by way of PPA compensation for 2019. We do not expect to see major changes in inventories, which are mostly comprised of energy guarantees of origin.

Looking ahead to future years, we predict that Polenergia will continue generating OCF equivalent to 90% of adjusted yearly EBITDA after tax.

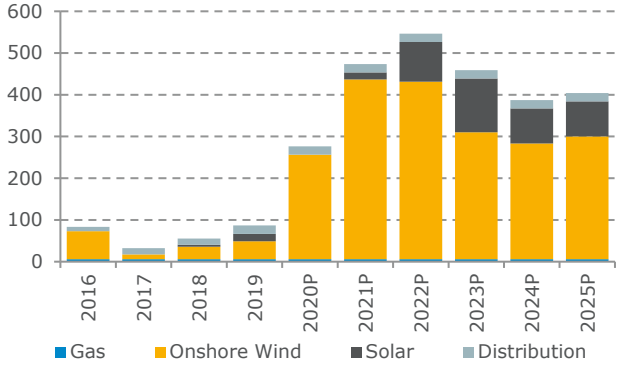
OCF vs. working capital of Polenergia (PLN m)



Source: Polenergia, P – mBank projection

Capital expenditures in 2019 totaled PLN 93m, almost entirely allocated to the development of RES capacity. This year, capital spend to 30 June amounted to PLN 35m (including a capital injection for the offshore wind SPV), with plans to step up investment in subsequent quarters to reach an aggregate PLN 371m for the whole year (any tasks not finished by the end of December can be deferred to next year). Polenergia has allocated PLN 17m of the CAPEX budget to investments in distribution.

CAPEX of Polenergia by operating segment (PLN m)



Source: Polenergia, P – mBank projection

Balance Sheet and Debt

Polenergia reported having net debt including PLN 58m lease liabilities of PLN 495m as of 31 December 2019, a lower amount than the PLN 594m recognized a year earlier before IFRS 16 rules took effect. The Company's debts consisted largely of bank loans (PLN 724m of PLN 782m total) attributed directly to the RES SPVs. All credit is denominated in Polish zloty with an estimated average margin above over the WIBOR rate of 3.2% in the last three years.

Note that Polenergia effectively hedges interest rate risk in today's low-rate environment (at the moment the Company is hedging more than 50% of the total exposure).

- **Financing for ongoing projects**: Polenergia has signed a financing agreement for the 38 MW Szymankowo wind farm (a PLN 171m bank facility plus a PLN 51m loan from Mansa Investments, implying an LTV of ~75%). Financing is also in place for the 121 MW Dębsk project in the form of a PLN 172m shareholder loan and a PLN 480m investment facility. The Kostomłoty plant also has available PLN 10m shareholder financing and PLN bank credit. A PLN 44m line of credit has been established for the Sulechów PV project (LTV ~70-75%).
- **Cash on hand**: Polenergia had a consolidated cash position of PLN 441m as of 30 June 2020 (up from PLN 346m in December 2019), but due to the financing formula the standalone cash balance provides a more meaningful reference.

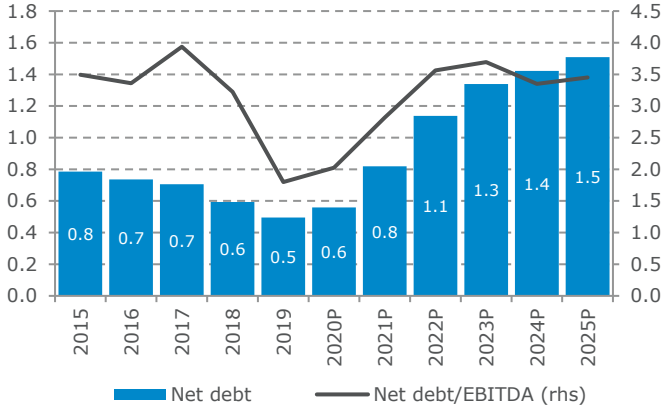
  Cash in the parent company stood at PLN 261m in June 2020, and assuming average LTV of 70% this suggests financing potential for projects worth a total of PLN 0.9bn.

  Going forward this potential will increase with returns from income-generating investments (ca. PLN 60m in 2020, PLN 19.5m in H1 2020). According to our estimates, with this mechanism of cash transfers from SPVs, Polenergia would be capable of financing solar PV projects worth PLN 2.7bn through 2025 (our 2020-25 CAPEX forecast is PLN 2.5bn).
- **Offshore wind farms**: It will take in the ballpark of PLN 19-20bn to complete the first stage of the offshore wind farm project (1.44 GW), of which approximately PLN 9.0-10bn would have to be shelled out by Polenergia under the current JV structure. The initial capital contribution is approximately PLN 2.2-2.6bn – commitments which exceed the Company's current funding capacity if we take into consideration the various other investment plans across different operating segments.

In order to accomplish the investment goals, Polenergia could opt to raise capital or onboard more co-investors for the offshore wind project, and potentially combine this with a debt issue by the parent company (with a net debt/EBITDA ratio expected to be in the 2.0-3.7x range in the next five years, the Company has plenty of room to increase leverage). With all that said, we do not factor the offshore wind project into our financial models for Polenergia for the time being.

- **Dividends**: We do not see Polenergia as initiating distributions to shareholders in the forecast period looking at its ambitious investment plans.

Net debt in PLN bn and as a ratio of EBITDA at Polenergia

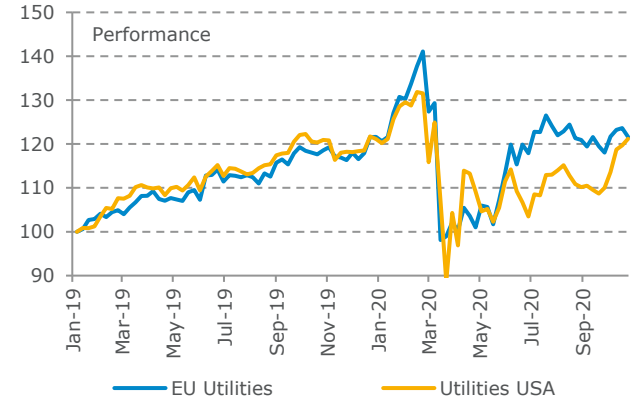


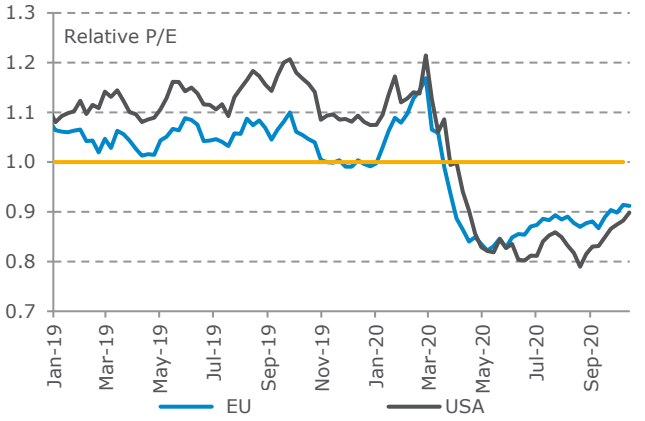
Source: Polenergia, P – mBank projection

Clean Energy Investments Eclipse Fossil Fuel Energy

Despite major differences in regulations and sensitivity to external conditions, utility sectors on different world stock markets retain a relatively high correlation, as evidenced by this year's behavior of indexes in the US and EU as they collapsed and rebounded in unison. The correlation is also evident in the respective forward price-earnings ratios relative to corresponding broad market multiples.

US and EU utilities performance chart (top) and relative price-earnings ratios (12M FWD P/E)*



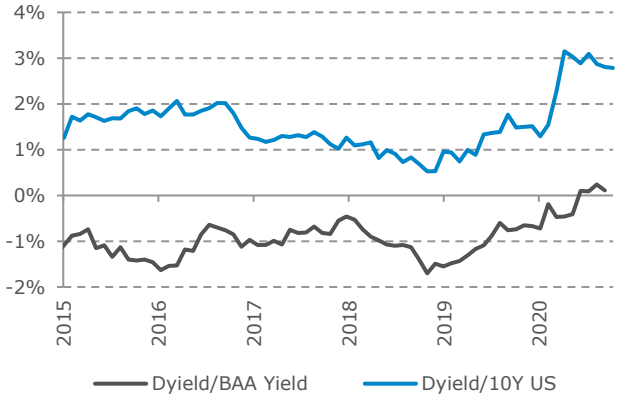


*P/E Stoxx Utilities vs. Stoxx600 for EU companies, S&P Utilities vs. S&P500 for US companies
Source: Bloomberg

It is interesting to note how the utility sector appears to have lost its appeal as a defensive strategy with the onset of the pandemic-driven crisis and as bond yields tightened. This is because investors started to worry about their dividends after lockdowns put a squeeze on company revenues. In addition, the prospect of reduced risk-free rates started to weigh down on earnings expectations.

The following graphic provides an illustration of how the fears of investors played out as a deviation from average of the spread between S&P Utilities dividend yield and US 10Y Treasuries, and the spread between government bond yields and highly-rated corporate bonds.

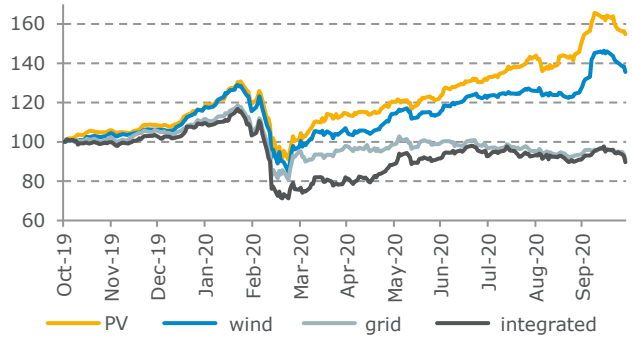
Dividend vs. Treasury yield spreads and Treasury vs. corporate yield spreads



Source: Bloomberg, mBank

Within the power utility sector, companies with renewable assets in their energy mix this year have outperformed traditional generators and TSOs, which have given negative returns for the year to date. The outperformance is supported, among others, by decreasing costs of clean generation technology, Europe's Green New Deal, offering financial stimulus in exchange for investment renewable energy, and the increasing odds of a Biden presidency in the US. The inflow of money into ESG funds is another major factor.

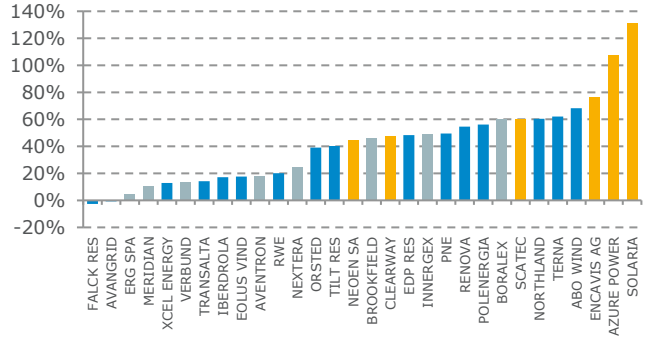
Utility performance chart by sources of energy



Source: Bloomberg, mBank

Top-performing utilities this year are those that invest in solar power, which has taken off across the globe as costs of solar panels fall and projects become economically viable without having to rely on government subsidies. Solar photovoltaics are also popular among infrastructure funds which also help fuel the upward momentum.

2020 ytd total returns on renewable energy stocks (incl. dividends)

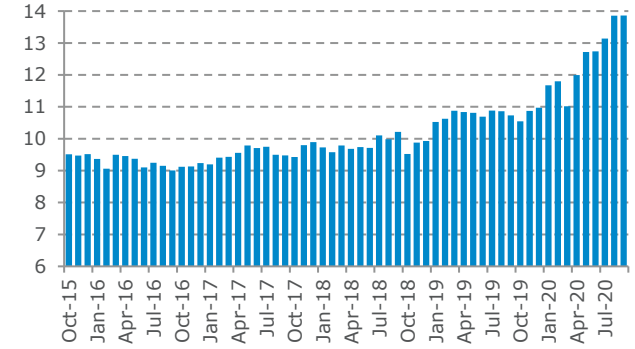


*Names in yellow have dominant solar exposure, names in blue have dominant wind exposure
Source: Bloomberg

The rebound in clean energy stocks is due to the market's discounting of increasingly favorable regulations and more solid prospects for sustainable earnings growth, as reflected is **expanding earnings multiples** (see diagram below). The re-rating process took hold last year, but it has accelerated noticeably over the last few months.

Out of 30 rated stocks, only four did not experience rises in their 12M FWD EV/EBITDA ratios in the last five years, with the **median ratio now 30% higher than at the onset**.

12M FWD EV/EBITDA ratios of companies a RES-heavy energy mix*



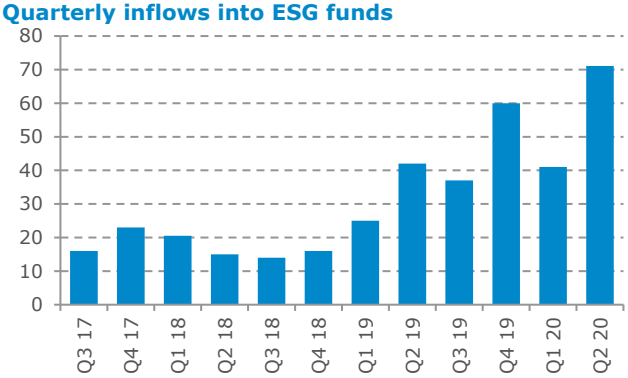
*30 selected US and EU stocks
Source: Bloomberg, mBank

When it comes to **ESG funds** as a value driver for the RES sector, in the second quarter of 2020 these funds registered inflows of $61 billion, which was equivalent to 30% of all money received by European investment funds in the period. Globally, the flow of money into sustainable funds amounted to $71 billion, and assets surpassed $1.06 billion.

The equity portfolios of **European ESG funds** recorded inflows of **$35 billion** in the second quarter, 63% more than traditional strategies. Furthermore, the **rates of return** on ESG investing are more attractive.

The global push to quit fossil fuels adds to the growing gap between the performance of companies that score well on ESG and those that are falling back. Today ESG strategies in some cases account for more than half of total fund investment, and according to a prediction by PwC by 2025 ESG assets will surpass €7 trillion, and increase from 15% today to 57% as a proportion of total AUM.

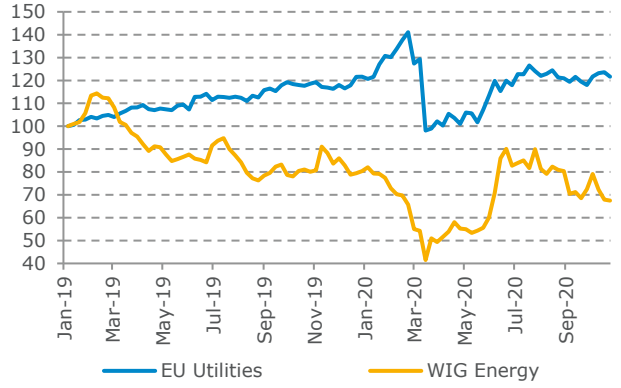
Quarterly inflows into ESG funds



Source: Morningstar, mBank

In Poland, the **WIG-Energy** utilities index to date has had a low correlation with EU indices due to differences in composition and investing strategies. Looking ahead, however, there are signs that the Polish energy sector is finally ready to join the global movement and embrace renewable energy, supported by changing mindsets among Poland's policymakers.
When it comes to winning back investors, however, it will take time and verifiable investment effort to convince them that Polish utilities are serious about carbon neutrality.

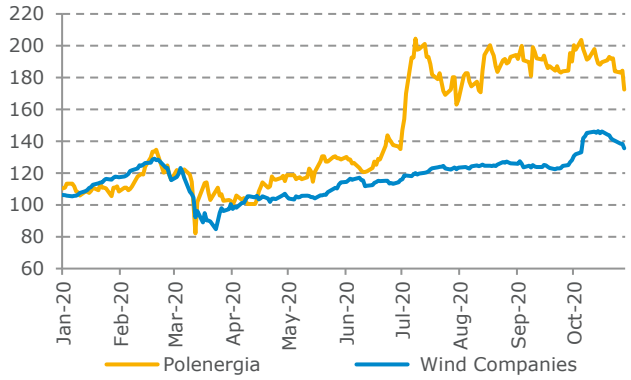
Polish vs. EU utilities performance comparison



Source: Bloomberg, mBank

Polenergia is already well on board with global trends, and to an extent this is reflected in its valuation, with more room still for further re-rating as new clean-tech projects start contributing to profits in 2-3 years.

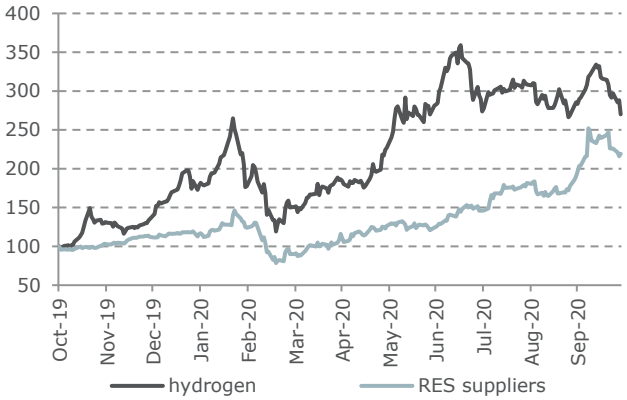
PEP performance vs. sector trends



Source: Bloomberg, mBank

The other, perhaps the biggest, beneficiaries of the green revolution are technology suppliers. In the last year an index tracking wind and solar plant components rallied over 200%, and the potential stakeholder stocks jumped 300% after the announcement of green hydrogen.

Energy technology supplier rally



Source: Bloomberg, mBank

Looking ahead, continued policy support for renewable energy, sustained inflows into ESG funds, further tightening of emissions, and an upward trend in prices of carbon allowances, will combine to push up the valuations of clean energy producers. With multiples this high, some of the capital will most likely be channeled in IPOs (Ignitis) and SPOs (Scatec Solar), but this should be offset by more M&As (such as the latest deals between Avangrid and PNM Resources and between Scatec/SN Power).

Valuation

Using DCF analysis and relative valuation, we set our 9-month target price for Polenergia at PLN 62.99.

(PLN)	weight	price
Relative Valuation	50%	54.12
DCF Analysis	50%	64.38
	price	59.25
	9M target price	**62.99**

DCF Valuation

Assumptions:

- Cash flow is discounted as of the end of October 2020. Equity value calculations factor in net debt as of 31 December 2019. including IFRS16 leases (PLN 58m).
- Macroeconomic assumptions are as set out below.
- The depreciation and amortization expenses projected for FY2029 are higher than CAPEX, prompting a D&A revision to PLN 200m when calculating terminal value.
- FCFTV calculations use sales revenue and EBITDA margin as forecast for 2029 after adjustment for revenues from green certificates, which are set to disappear from 2031.
- We assume that the book value of the offshore project is PLN 154m.
- We assume that FCF after FY2029 will grow at an annual rate of 2.5%. The risk-free rate is 3.5%, and beta is 1.0.

Additional Assumptions

	2019	2020P	2021P	2022P	2023P	2024P	2025P	2026P	2027P	2028P	2029P
EEX power price (EUR/MWh)	48.1	40.4	44.0	46.3	47.3	48.3	49.4	50.5	51.7	52.9	54.2
TGE power price (PLN/MWh)	239.3	266.7	235.0	253.7	257.0	264.2	255.9	263.1	270.8	279.0	287.7
EUA price (EUR/t)	25.2	24.7	30.0	32.0	34.1	36.3	38.7	41.3	44.0	46.9	50.0
Green certificate price (PLN/MWh)	131.6	140.0	148.6	157.7	167.3	177.6	188.5	200.0	200.0	200.0	200.0
PEP generation volumes (TWh)	1.5	1.5	1.5	1.8	2.1	2.2	2.4	2.6	2.7	2.9	3.1
gas-fired power	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
onshore wind power	0.7	0.7	0.7	1.0	1.2	1.3	1.5	1.6	1.7	1.9	2.0
solar power	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3
RAV (PLN m)	92.0	96.4	117.0	127.2	135.9	143.4	149.6	154.6	158.3	160.8	161.9

mBank Biuro maklerskie

DCF Model

(PLN m)	2020P	2021P	2022P	2023P	2024P	2025P	2026P	2027P	2028P	2029P	2029+
Revenue	1,689	1,843	2,044	2,151	2,286	2,281	2,407	2,503	2,633	2,729	2,729
change	-34.9%	9.1%	10.9%	5.2%	6.3%	-0.2%	5.5%	4.0%	5.2%	3.6%	0.0%
EBITDA	276.2	291.0	319.4	362.4	424.4	437.3	491.1	509.8	560.6	571.8	522.4
EBITDA margin	16.4%	15.8%	15.6%	16.9%	18.6%	19.2%	20.4%	20.4%	21.3%	21.0%	19.1%
D&A expenses	102.7	107.5	125.4	144.3	157.5	170.1	173.6	187.3	201.1	214.9	200.0
EBIT	173.5	183.5	194.0	218.1	266.9	267.3	317.5	322.5	359.5	356.8	322.4
EBIT margin	10.3%	10.0%	9.5%	10.1%	11.7%	11.7%	13.2%	12.9%	13.7%	13.1%	11.8%
Tax on EBIT	33.0	34.9	36.9	41.4	50.7	50.8	60.3	61.3	68.3	67.8	61.3
NOPLAT	140.5	148.6	157.1	176.7	216.2	216.5	257.1	261.2	291.2	289.0	261.2
CAPEX	-296	-474	-547	-459	-387	-404	-410	-410	-338	-200	-200
Working capital	24.3	-2.3	-3.0	-1.6	-2.0	0.1	-1.9	-1.4	-1.9	-1.4	-1.4
Equity investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FCF	-28.9	-219.7	-267.1	-139.5	-15.5	-17.4	18.9	37.1	152.3	302.5	259.7
WACC	6.6%	5.9%	5.1%	4.7%	4.8%	4.9%	5.1%	5.3%	5.7%	6.3%	7.0%
discount factor	98.9%	93.5%	88.9%	84.9%	81.0%	77.2%	73.5%	69.9%	66.1%	62.2%	62.2%
PV FCF	-28.6	-205.4	-237.5	-118.5	-12.6	-13.4	13.9	25.9	100.7	188.1	
WACC	6.6%	5.9%	5.1%	4.7%	4.8%	4.9%	5.1%	5.3%	5.7%	6.3%	7.0%
Cost of debt	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
Risk-free rate	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Risk premium	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Effective tax rate	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Net debt / EV	39.9%	54.3%	70.5%	77.4%	75.7%	74.6%	70.8%	66.9%	58.3%	45.5%	30.0%
Cost of equity	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%
Risk premium	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Beta	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FCF growth after the forecast period	2.5%
Terminal value	5,717
Present value of terminal value	3,555
Present value of FCF in the forecast period	-287
Enterprise value	3,268
Net debt (2019 eop)	495
Minority interests	1
Offshore assets	154
Equity value	2,925
Shares outstanding (millions)	45
Equity value per share (PLN)	64.4
9M cost of equity	8.5%
9M target price (PLN)	**68.4**
EV/EBITDA('20) at target price	13.1
P/E('20) at target price	29.4
TV / EV	109%

Sensitivity Analysis

	FCF growth in perpetuity				
	0.5%	1.5%	2.5%	3.5%	4.5%
WACC +1.0 p.p.	35.4	43.0	53.4	68.4	91.9
WACC +0.5 p.p.	38.9	47.8	60.2	78.7	109.4
WACC	43.0	53.4	**68.4**	91.9	133.8
WACC -0.5 p.p.	47.8	60.2	78.7	109.4	170.2
WACC -1.0 p.p.	53.4	68.4	91.9	133.8	230.1

Relative Valuation

We compared the forward P/E and EV/EBITDA multiples of Polenergia with the multiples of the corresponding peer groups as projected for fiscal 2020 through 2022.

Multiples Comparison

		P/E				EV/EBITDA			
	Price	2019	2020E	2021E	2022E	2019	2020E	2021E	2022E
WIND ENERGY (81% EBITDA CONTRIBUTION)									
ABO WIND	28.40	21.4	18.0	12.5	11.6	9.6	10.0	7.6	7.2
AVANGRID	50.04	22.5	24.4	21.6	19.6	11.0	12.0	11.2	11.0
BORALEX	39.01	696.6	80.1	73.5	49.8	15.1	13.5	13.6	-
EDP RENOVAVEIS	15.92	31.6	29.4	34.0	31.5	11.1	12.0	12.1	11.6
EOLUS VIND	133.40	21.2	15.7	11.4	18.8	15.4	11.9	6.9	10.6
FALCK RENEWABLES	4.63	31.9	37.1	30.9	25.3	10.5	11.0	10.4	9.8
IBERDROLA	10.22	19.3	18.2	17.0	16.2	11.1	10.8	10.3	9.9
ORSTED	973.00	62.1	56.3	44.5	43.4	26.6	24.6	19.8	19.0
PNE	6.00	206.9	-	139.5	74.1	18.6	28.0	18.3	15.8
RWE	31.39	18.2	19.6	16.1	16.7	8.0	7.2	7.0	6.7
TERNA ENERGY	11.30	25.7	20.2	16.9	14.5	12.3	10.2	10.8	9.6
TILT RENEWABLES	3.85	139.6	32.1	-	259.2	13.7	8.7	21.9	15.3
TRANSALTA RENEWABLES	16.88	21.0	31.9	20.9	20.3	12.4	11.3	11.1	11.0
XCEL ENERGY	71.05	27.1	25.5	23.9	22.5	14.5	13.9	13.1	12.6
Median		26.4	25.5	21.6	21.4	12.3	11.6	11.1	11.0
SOLAR ENERGY (1% EBITDA CONTRIBUTION)									
AZURE POWER GLOBAL	27.49	-	-	-	710.6	19.9	17.8	17.0	13.7
CLEARWAY ENERGY	28.86	131.2	31.4	34.9	84.9	12.7	-	-	11.3
ENCAVIS	16.52	39.4	41.7	34.1	32.6	17.5	17.9	15.7	14.9
NEOEN	45.10	113.6	123.2	83.5	57.3	26.5	22.0	18.7	16.2
RENOVA	1696.00	-	44.3	135.9	93.5	-	-	23.1	20.7
SCATEC SOLAR	199.00	610.4	159.3	52.9	46.4	28.3	18.0	14.8	11.9
SOLARIA ENERGIA	16.43	144.1	108.8	63.0	32.7	67.3	50.1	31.5	19.4
Median		131.2	76.5	57.9	57.3	23.2	18.0	17.8	14.9
DISTRIBUTION & TRADING (11% EBITDA CONTRIBUTION)									
E.ON	8.89	13.7	14.6	12.7	10.1	11.0	9.3	8.8	8.5
ELIA GROUP	83.20	21.4	21.7	20.6	19.2	12.5	13.6	13.6	12.9
EVN	13.38	8.0	11.6	10.2	9.8	6.5	7.4	6.7	6.0
IREN	1.93	10.1	11.6	10.6	9.2	6.0	6.6	6.4	6.0
NATIONAL GRID	924.80	15.9	15.7	17.6	16.4	11.9	11.6	12.6	11.9
RED ELECTRICA	15.11	11.4	12.2	12.2	11.8	9.0	9.3	9.3	9.3
REDES ENERGETICAS	2.21	12.8	11.3	11.3	11.2	8.8	9.0	8.9	8.9
SSE	1250.00	18.6	15.2	15.8	14.9	12.1	12.3	12.7	11.8
TERNA	5.77	15.7	15.1	14.9	14.7	11.6	11.4	11.5	11.7
Median		13.7	14.6	12.7	11.8	11.0	9.3	9.3	9.3
CONVENTIONAL GENERATION (7%)									
CEZ	442.50	13.8	10.7	12.3	12.1	6.8	6.7	7.2	7.4
EDF	9.84	16.3	19.4	17.4	15.1	4.9	5.8	5.4	5.1
EDP	4.14	18.9	19.5	17.9	17.0	9.7	9.0	8.9	8.8
ENDESA	22.67	15.5	13.9	13.7	13.8	8.4	7.9	8.0	8.1
ENEL	6.94	14.7	13.8	12.9	12.2	7.5	7.5	7.2	7.0
ENGIE	10.27	10.0	14.3	9.9	9.0	5.7	6.0	5.2	5.1
FORTUM	16.02	9.4	10.9	11.3	12.2	11.7	8.0	7.2	7.3
Median		14.7	13.9	12.9	12.2	7.5	7.5	7.2	7.3
Median mix		**24.9**	**23.8**	**20.2**	**19.9**	**11.9**	**11.1**	**10.7**	**10.5**
Polenergia	42.60	17.8	18.3	17.9	18.4	8.8	9.0	9.5	9.6
Premium/discount to median		-28.7%	-23.2%	-11.4%	-7.9%	-25.9%	-18.7%	-11.5%	-8.6%
Implied Valuation									
Median		24.9	23.8	20.2	19.9	11.9	11.1	10.7	10.5
Multiple weight				50.0%				50.0%	
Year weight		0.0%	33.3%	33.3%	33.3%	0.0%	33.3%	33.3%	33.3%
Implied Valuation		50.7							
Offshore assets (PLN)		3.4							
Implied value per share (PLN)		**54.1**							

Earnings History and Future Projections

(PLN m)	2017	2018	2019	2020P	2021P	2022P	2023P
Revenue	2,762.4	3,448.7	2,596.6	1,689.1	1,843.3	2,043.6	2,150.6
change	-7.8%	24.8%	-24.7%	-34.9%	9.1%	10.9%	5.2%
EBITDA	84.2	179.3	261.9	276.2	291.0	319.4	362.4
EBITDA (adj.), of which:	179.2	184.1	275.3	276.2	291.0	319.4	362.4
Onshore	81.1	90.7	174.9	228.9	230.5	281.1	319.7
Solar	0.0	0.0	0.0	2.8	2.5	2.5	9.8
Gas	72.7	109.9	80.7	18.8	38.3	14.3	8.2
Distribution	16.4	14.5	15.1	16.0	18.1	19.7	22.1
Trading	13.1	-16.0	14.8	22.2	14.6	15.2	16.3
Other	-4.1	-15.0	-10.1	-12.6	-13.0	-13.4	-13.7
EBIT	-12.9	83.8	160.4	173.5	183.5	194.0	218.1
change	-	-	91.5%	8.1%	5.8%	5.7%	12.4%
EBIT margin	-0.5%	2.4%	6.2%	10.3%	10.0%	9.5%	10.1%
Net financing gains/losses	-54.4	-55.1	-43.8	-42.9	-50.0	-63.7	-76.1
Equity in profits/losses of associates	0.0	12.0	20.2	0.0	0.0	0.0	0.0
Pre-tax profit	-67.3	40.7	136.9	130.6	133.5	130.2	142.0
Tax	20.4	37.3	27.8	24.8	25.4	24.7	27.0
Minority interests	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net profit	-87.7	3.4	109.0	105.8	108.1	105.5	115.0
change	-	-	-	-3.0%	2.2%	-2.4%	9.1%
margin	-3.2%	0.1%	4.2%	6.3%	5.9%	5.2%	5.3%
D&A expenses	97.1	95.5	101.5	102.7	107.5	125.4	144.3
EBITDA	84.2	179.3	261.9	276.2	291.0	319.4	362.4
change	55.3%	113.1%	46.0%	5.5%	5.4%	9.8%	13.5%
EBITDA margin	3.0%	5.2%	10.1%	16.4%	15.8%	15.6%	16.9%
Shares outstanding at eop (millions)	45.4	45.4	45.4	45.4	45.4	45.4	45.4
EPS	-1.9	0.1	2.4	2.3	2.4	2.3	2.5
CEPS	0.2	2.2	4.6	4.6	4.7	5.1	5.7
ROAE	-7.2%	0.3%	8.8%	7.9%	7.4%	6.8%	6.9%
ROAA	-3.1%	0.1%	3.9%	4.1%	3.8%	3.2%	3.2%

Balance Sheet

(PLN m)	2017	2018	2019	2020P	2021P	2022P	2023P
ASSETS	2,664.3	3,054.3	2,479.8	2,667.7	3,044.5	3,479.7	3,801.8
Fixed assets	2,049.5	1,877.4	1,881.0	2,074.7	2,440.7	2,861.9	3,176.5
Property, plant and equipment	1,790.9	1,589.3	1,630.7	1,825.7	2,193.6	2,614.8	2,929.3
Intangible assets	30.1	19.5	9.3	8.0	6.1	6.1	6.1
Equity investments	184.6	69.6	69.6	69.6	69.6	69.6	69.6
Other fixed assets	43.9	199.1	171.4	171.4	171.4	171.4	171.4
Current assets	614.8	1,176.9	598.7	593.0	603.8	617.8	625.3
Inventory	26.2	35.0	38.3	40.5	44.2	49.0	51.6
Current receivables	123.1	116.0	85.7	77.7	84.8	94.0	98.9
Other current assets	167.6	714.0	129.0	129.0	129.0	129.0	129.0
Cash and cash equivalents	297.9	311.9	345.7	345.7	345.7	345.7	345.7

(PLN m)	2017	2018	2019	2020P	2021P	2022P	2023P
EQUITY & LIABILITIES	2,664.3	3,054.3	2,479.8	2,667.7	3,044.5	3,479.7	3,801.8
Equity	1,181.1	1,184.8	1,294.3	1,400.1	1,508.2	1,613.7	1,728.7
Share capital	90.9	90.9	90.9	90.9	90.9	90.9	90.9
Other equity	1,090.2	1,094.0	1,203.4	1,309.2	1,417.3	1,522.8	1,637.8
Minority interest	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Non-current liabilities	894.8	954.4	939.4	998.9	1,242.5	1,540.9	1,729.1
Loans	705.5	792.3	732.4	791.9	1,035.5	1,333.8	1,522.1
Other	189.3	162.1	207.0	207.0	207.0	207.0	207.0
Current liabilities	587.4	914.2	245.1	267.7	292.8	324.2	343.0
Loans	298.0	113.1	50.0	54.1	70.7	91.1	103.9
Trade payables	129.6	129.4	74.3	92.9	101.4	112.4	118.3
Other	159.8	671.6	120.7	120.7	120.7	120.7	120.7
Debt	1,003.5	905.4	840.9	904.5	1,164.7	1,483.4	1,684.5
Net debt	705.6	593.5	495.2	558.8	819.0	1,137.7	1,338.8
Net Debt / Equity	59.7%	50.1%	38.3%	39.9%	54.3%	70.5%	77.4%
Net Debt/ EBITDA	8.4	3.3	1.9	2.0	2.8	3.6	3.7
BVPS	26.0	26.1	28.5	30.8	33.2	35.5	38.0

mBank Biuro maklerskie

Cash Flow

(PLN m)	2017	2018	2019	2020P	2021P	2022P	2023P
Cash flow from operating activities	111.6	111.9	262.6	275.7	263.3	291.7	333.8
Net profit	-67.3	40.7	136.9	130.6	133.5	130.2	142.0
D&A expenses	97.1	95.5	101.5	102.7	107.5	125.4	144.3
Working capital	-77.2	-57.4	2.8	24.3	-2.3	-3.0	-1.6
Other	159.0	33.0	21.6	18.0	24.7	39.0	49.1
Cash flow from investing activities	-24.8	56.1	-56.9	-296.4	-473.5	-546.6	-458.9
CAPEX	-32.2	-28.7	-86.6	-296.4	-473.5	-546.6	-458.9
Other	7.4	84.8	29.7	0.0	0.0	0.0	0.0
Cash flow from financing activities	-169.8	-153.8	-171.9	20.7	210.2	254.9	125.1
Share issue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt	-114.2	-106.9	-126.0	63.6	260.2	318.7	201.1
Dividends/Buyback	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	-55.6	-47.0	-45.9	-42.9	-50.0	-63.7	-76.1
Change in cash	-83.0	14.0	33.8	0.0	0.0	0.0	0.0
Cash at eop	297.9	311.9	345.7	345.7	345.7	345.7	345.7
DPS (PLN)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FCF	-45.7	55.9	150.2	-20.7	-210.2	-254.9	-125.1
CAPEX/Sales	1.2%	0.8%	3.3%	17.5%	25.7%	26.7%	21.3%

Trading Multiples

	2017	2018	2019	2020P	2021P	2022P	2023P
P/E	-	568.7	17.8	18.3	17.9	18.4	16.8
P/CE	207.0	19.6	9.2	9.3	9.0	8.4	7.5
P/B	1.6	1.6	1.5	1.4	1.3	1.2	1.1
P/S	0.7	0.6	0.7	1.1	1.1	0.9	0.9
FCF/EV	-1.7%	2.2%	6.2%	-0.8%	-7.6%	-8.3%	-3.8%
EV/EBITDA	31.4	14.1	9.3	9.0	9.5	9.6	9.0
EV/EBIT	-	30.2	15.2	14.4	15.0	15.9	15.0
EV/S	1.0	0.7	0.9	1.5	1.5	1.5	1.5
Dividend Yield	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Price (PLN)	**42.6**	**42.6**	**42.6**	**42.6**	**42.6**	**42.6**	**42.6**
Shares outstanding at eop (millions)	45.4	45.4	45.4	45.4	45.4	45.4	45.4
MC (PLN m)	1,935.9	1,935.9	1,935.9	1,935.9	1,935.9	1,935.9	1,935.9
Minority interest (PLN m)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EV (PLN m)	2,642.4	2,530.3	2,432.0	2,495.6	2,755.8	3,074.5	3,275.7

List of abbreviations and ratios contained in the report:
EV – net debt + market value
EBIT – Earnings Before Interest and Taxes
EBITDA – EBIT + Depreciation and Amortisation
P/CE – price to earnings with amortisation
MC/S – market capitalisation to sales
EBIT/EV – operating profit to economic value
P/E – (Price/Earnings) – price divided by annual net profit per share
ROE – (Return on Equity) – annual net profit divided by average equity
P/BV – (Price/Book Value) – price divided by book value per share
Net debt – credits + debt papers + interest bearing loans – cash and cash equivalents
EBITDA margin – EBITDA/Sales

OVERWEIGHT (OW) – a rating which indicates that we expect a stock to outperform the broad market
NEUTRAL (N) – a rating which indicates that we expect the stock to perform in line with the broad market
UNDERWEIGHT (UW) – a rating which indicates that we expect the stock to underperform the broad market

Recommendations of Biuro maklerskie mBanku:
A recommendation is valid for a period of 9 months, unless a subsequent recommendation is issued within this period. Expected returns from individual recommendations are as follows:
BUY – we expect that the rate of return from an investment will be at least 15%
ACCUMULATE – we expect that the rate of return from an investment will range from 5% to 15%
HOLD – we expect that the rate of return from an investment will range from -5% to +5%
REDUCE – we expect that the rate of return from an investment will range from -5% to -15%
SELL – we expect that an investment will bear a loss greater than 15%
Recommendations are updated at least once every nine months.

mBank S.A. with its registered office in Warsaw at Senatorska 18 renders brokerage services in the form of derived organisational unit – Brokerage Office which uses name Biuro maklerskie mBanku.

mBank S.A. as part of the Exchange's Analytical Coverage Support Programme ("Programme", https://www.gpw.pl/eacsp) prepares analytical reports for the following companies: Cognor Holding, Comarch, Sygnity, VRG. These documents are prepared at the request of Giełda Papierów Wartościowych w Warszawie S.A. ('WSE'), which is entitled to copyrights to these materials. mBank S.A. receives remuneration from the WSE for the preparation of the reports. All documents prepared for the Programme are available at:
https://www.mdm.pl/ui-pub/site/market_and_analysis/analysis_and_recommendations/analytical_coverage_support_programme

This document has been created and published by Biuro maklerskie mBanku. The present report expresses the knowledge as well as opinions of the authors on day the report was prepared. The opinions and estimates contained herein constitute our best judgment at this date and time, and are subject to change without notice. The present report was prepared with due care and attention, observing principles of methodological correctness and objectivity, on the basis of sources available to the public, which Biuro maklerskie mBanku considers reliable, including information published by issuers, shares of which are subject to recommendations. However, Biuro maklerskie mBanku, in no case, guarantees the accuracy and completeness of the report, in particular should sources on the basis of which the report was prepared prove to be inaccurate, incomplete or not fully consistent with the facts. mBank S.A. bears no responsibility for investment decisions taken on the basis of the present report or for any damages incurred as a result of investment decisions taken on the basis of the present report.

This document does not constitute an offer or invitation to subscribe for or purchase any financial instruments and neither this document nor anything contained herein shall form the basis of any contract or commitment whatsoever. It is being furnished to you solely for your information and may not be reproduced or redistributed to any other person This document does not constitute investment, legal, accounting or other advice, and mBank is not liable for damages resulting from or related to the use of data provided in the documents. This document may not be copied, duplicated and/or be directly or indirectly distributed in the United States, Canada, Australia or Japan, nor transferred to citizens or residents of a state where its distribution may be legally restricted, which does not limit the possibility of publishing materials prepared for the Programme on Cognor Holding, Comarch, Sygnity, VRG, mBank or WSE websites. Persons who disseminate this document should be aware of the need to comply with such restrictions.

Recommendations are based on essential data from the entire history of a company being the subject of a recommendation, with particular emphasis on the period since the previous recommendation.

Investing in shares is connected with a number of risks including, but not limited to, the macroeconomic situation of the country, changes in legal regulations as well as changes on commodity markets. Full elimination of these risks is virtually impossible.

It is possible that mBank S.A. in its brokerage activity renders, will render or in the past has rendered services for companies and other entities mentioned in the present report.

mBank S.A. does not rule out offering brokerage services to an issuer of securities being the subject of a recommendation. Information concerning a conflict of interest arising in connection with issuing a recommendation (should such a conflict exist) is located below.

The present report was not transferred to the issuer prior to its publication.

The production of this recommendation was completed on October 30, 2020, 8:27 AM.
This recommendation was first disseminated on October 30, 2020, 8:27 AM.

mBank S.A., its shareholders and employees may hold long or short positions in the issuer's shares or other financial instruments related to the issuer's shares.

Copying or publishing the present report, in full or in part, or disseminating in any way information contained in the present report requires the prior written consent of mBank S.A.

Recommendations are addressed to all Clients of Biuro maklerskie mBanku.

All investment recommendations and strategies issued by mBank S.A. over the last 12 months are available at:
http://www.mdm.pl/ui-pub/site/market_and_analysis/analysis_and_recommendations/fundamental_analysis/recommendations?recent_filter_active=true&lang=en

The activity of mBank S.A. is subject to the supervision of the Polish Financial Supervision Commission.

Individuals who did not participate in the preparation of recommendations, but had or could have had access to recommendations prior to their publication, are employees of Dom Maklerski mBanku authorised to access the premises in which recommendations are prepared and/or individuals having to access to recommendations based on their corporate roles, other than the analysts mentioned as the authors of the present recommendations.

This publication constitutes investment research within the meaning of Art. 36.1 of Commission Delegated Regulation (EU) 2017/565.

The compensation of the research analysts responsible for preparing investment research is determined independently of and without regard to the compensation of or revenue generated by any other employee of the Bank, including but not limited to any employee whose business interests may reasonably be considered to conflict with the interests of the persons to whom the investment research prepared by the Research Department of Dom Maklerski mBanku is disseminated. With that being said, since one of the factors taken into consideration when determining the compensation of research analysts is the degree of fulfillment of annual financial targets by customer service functions, there is a risk that the adequacy of compensation offered to persons preparing investment research will be questioned by a competent oversight body.

For U.S. persons only: This research report is a product of mBank SA which is the employer of the research analyst(s) who has prepared the research report. The research analyst(s) preparing the research report is/are resident outside the United States (U.S.) and are not associated persons of any U.S. regulated broker-dealer and therefore the analyst(s) is/are not subject to supervision by a U.S. broker-dealer, and is/are not required to satisfy the regulatory licensing requirements of FINRA or required to otherwise comply with U.S. rules or regulations regarding, among other things, communications with a subject company, public appearances and trading securities held by a research analyst account.
This report is intended for distribution by mBank SA only to "Major Institutional Investors" as defined by Rule 15a-6(b)(4) of the U.S. Securities and Exchange Act, 1934 (the Exchange Act) and interpretations thereof by U.S. Securities and Exchange Commission (SEC) in reliance on Rule 15a 6(a)(2). If the recipient of this report is not a Major Institutional Investor as specified above, then it should not act upon this report and return the same to the sender. Further, this report may not be copied, duplicated and/or transmitted onward to any U.S. person, which is not the Major Institutional Investor.
In reliance on the exemption from registration provided by Rule 15a-6 of the Exchange Act and interpretations thereof by the SEC in order to conduct certain business with Major Institutional Investors, mBank SA has entered into an agreement with a U.S. registered broker-dealer, Cabrera Capital Markets. ("Cabrera"). Transactions in securities discussed in this research report should be effected through Cabrera or another U.S. registered broker dealer.

Strong and weak points of valuation methods used in recommendations:
DCF – acknowledged as the most methodologically correct method of valuation; it consists in discounting financial flows generated by a company; its weak point is the significant susceptibility to a change of forecast assumptions in the model.
Relative – based on a comparison of valuation multipliers of companies from a given sector; simple in construction, reflects the current state of the market better than DCF; weak points include substantial variability (fluctuations together with market indices) as well as difficulty in the selection of the group of comparable companies.
Economic profits – discounting of future economic profits; the weak point is high sensitivity to changes in the assumptions made in the valuation model.
Discounted Dividends (DDM) – discounting of future dividends; the weak point is high sensitivity to changes in the assumptions as to future dividends made in the valuation model.
NAV - valuation based on equity value, one of the most frequently used method in case of developing companies; the weak point of the method is that it does not factor in future changes in revenue/profits of a company.

mBank S.A. did not issue any recommendations for Polenergia in the 12 months prior to this publication.

mBank Biuro maklerskie

mBank S.A.
Senatorska 18
00-950 Warszawa
http://www.mbank.pl/

Research Department

Kamil Kliszcz
director
+48 22 438 24 02
kamil.kliszcz@mbank.pl
energy, power generation

Michał Marczak
+48 22 438 24 01
michal.marczak@mbank.pl
strategy

Michał Konarski
+48 22 438 24 05
michal.konarski@mbank.pl
banks, financials

Jakub Szkopek
+48 22 438 24 03
jakub.szkopek@mbank.pl
industrials, chemicals, metals

Paweł Szpigiel
+48 22 438 24 06
pawel.szpigiel@mbank.pl
media, IT, telco

Piotr Bogusz
+48 22 438 24 08
piotr.bogusz@mbank.pl
retail, gaming

Aleksandra Szklarczyk
+48 22 438 24 04
aleksandra.szklarczyk@mbank.pl
construction, real-estate development

Piotr Poniatowski
+48 22 438 24 09
piotr.poniatowski@mbank.pl
industrials

Mikołaj Lemańczyk
+48 22 438 24 07
mikolaj.lemanczyk@mbank.pl
banks, financials

Sales and Trading

Traders

Piotr Gawron
director
+48 22 697 48 95
piotr.gawron@mbank.pl

Krzysztof Bodek
+48 22 697 48 89
krzysztof.bodek@mbank.pl

Tomasz Jakubiec
+48 22 697 47 31
tomasz.jakubiec@mbank.pl

Adam Prokop
+48 22 697 47 90
adam.prokop@mbank.pl

Magdalena Bernacik
+48 22 697 47 35
magdalena.bernacik@mbank.pl

Andrzej Sychowski
+48 22 697 48 46
andrzej.sychowski@mbank.pl

Sales, Foreign Markets

Bartosz Orzechowski
+48 22 697 48 47
bartosz.orzechowski@mbank.pl

Jędrzej Łukomski
+48 22 697 49 85
jedrzej.lukomski@mbank.pl

Private Client Sales

Kamil Szymański
director
+48 22 697 47 06
kamil.szymanski@mbank.pl

Jarosław Banasiak
deputy director
+48 22 697 48 70
jaroslaw.banasiak@mbank.pl