PNE AG

(CDAX, Renewables)

WARBURG RESEARCH

Buy

EUR 4.30 (EUR 3.70)

Price EUR 2.93

Upside 46.8 %

Value Indicators:	EUR
DCF:	4.32

Share data:	
Bloomberg:	PNE3 GR
Reuters:	PNEGn
ISIN:	DE000A0JBPG2

Description:

International wind energy project developer for onshore and offshore wind parks.

Market Snapshot:	EUR m
Market cap:	218.0
No. of shares (m):	74.4
EV:	309.9
Freefloat MC:	160.3
Ø Trad. Vol. (30d):	457.02 th

Shareholders:	
Freefloat	73.6 %
Universal Investment GmbH	12.2 %
Active Ownership Fund SCS	5.1 %
Axxion S.A.	3.2 %
Mr. Wilhelm K.T. Zours	3.0 %

Risk Profile (WRe):	2019e
Beta:	1.8
Price / Book:	0.9 x
Equity Ratio:	44 %
Net Fin. Debt / EBITDA:	3.2 x
Net Debt / EBITDA:	3.2 x

Getting energised – preparing for a big leap

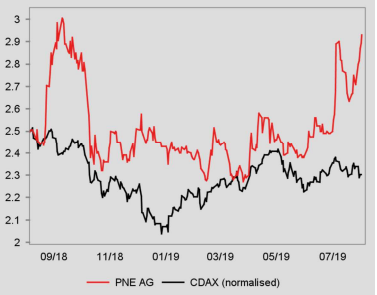
PNE is one of the most successful project developers with a proven track record of more than 4 GW in onshore and offshore wind projects. In addition to the rather volatile project business, PNE provides O&M services for the operation of international wind farms with a total output of more than 1.500 MW, providing a recurring revenue base. As part of the “Scale up” strategy presented in 2017, PNE is evolving into a clean energy solution provider and is opening up new strategic growth opportunities by extending its range of services and technologies. Following a change of analyst, we have reviewed our estimates and remain a buyer with a PT of EUR 4.30.

Strong international deal pipeline pays off: In the first half of 2019, PNE was able to sell several large projects from its international pipeline. The projects Malarberget (113 MW) in Sweden and Jasna (132 MW) in Poland were sold prior to construction, but with PNE as construction service provider. We expect PNE to capitalise on its international pipeline in the future, especially in France, Sweden and the US. Additionally, the Panama pipeline purchased in 2019 should generate first project sales in 2020 and trigger further growth in Latin America.

Portfolio sale in 2020 is not reflected in share price development: PNE’s onshore portfolio currently contains 71.3 MW of German onshore projects. We expect further additions of approx. 20 MW in 2019, as several projects were successfully awarded in the German tender and are currently under construction. The remaining volume needed to reach the target size of 200 MW is supported by a well-filled pipeline of German and French projects and should be added in the course of 2020. We expect the portfolio sale to generate an EBIT of EUR 69m, assuming EBIT of EUR 0.35m per MW. In addition, power generation from the held wind farms generates high-margin revenues from power sales, supporting 2019e and 2020e results. We believe that the planned portfolio sale is not reflected in the recent share price development, as we expect BV/S to rise to EUR 3.77 at the end of 2020, which implies a discount of approx. 25% to the current share price level.

Attractive returns underline value creation: Since PNE’s earnings generation has traditionally been volatile, we prefer to take a multi-year approach to determine the company’s returns. Over the last ten years, PNE has generated a historical average annual ROE of 11.6% and an average annual ROCE of 10.7%, which highlights the effective use of shareholders’ funds as well as the value creation in excess of the company’s WACC. We expect both ROE and ROCE to peak at 23.1% and 27.4% respectively in 2020. This supports our view that a discount to our estimated 2020 BV/S is unjustified.

Different valuation methods indicate undervaluation: Our updated DCF-based price target indicates a fair value of EUR 4.30 per share. Alternatively, we have valued PNE’s onshore pipeline with a probability-weighted approach at EUR 312m (EUR 4.00 per share). We regard this as an absolute floor value, as this approach does not reflect any pipeline additions in the future. In addition, the share is currently trading below its 2018 book value and far below our expected BV/S for 2020. We consider this unjustified in light of PNE’s attractive average ROE generation of 11.6% over the last ten years and our earnings estimates for 2019 and 2020.



Rel. Performance vs CDAX:	
1 month:	4.0 %
6 months:	19.3 %
Year to date:	9.3 %
Trailing 12 months:	22.0 %

Company events:	
08.08.19	Q2
07.11.19	Q3

FY End: 31.12. in EUR m	CAGR (18-21e)	2015	2016	2017	2018	2019e	2020e	2021e
Sales	16.2 %	109.5	248.6	114.1	91.4	128.4	284.3	143.5
Change Sales yoy		-48.2 %	127.0 %	-54.1 %	-19.9 %	40.5 %	121.5 %	-49.5 %
Gross profit margin		*64.5 %*	*61.6 %*	*60.5 %*	*76.3 %*	*57.3 %*	*58.3 %*	*53.6 %*
EBITDA	25.0 %	19.7	110.0	28.6	16.5	28.9	103.2	32.2
Margin		*18.0 %*	*44.2 %*	*25.1 %*	*18.1 %*	*22.5 %*	*36.3 %*	*22.5 %*
EBIT	45.9 %	9.8	97.0	23.1	7.8	16.3	88.7	24.3
Margin		*8.9 %*	*39.0 %*	*20.3 %*	*8.6 %*	*12.7 %*	*31.2 %*	*16.9 %*
Net income	-	3.5	69.0	17.1	-1.1	5.1	64.6	12.3
EPS	-	0.05	0.90	0.22	-0.01	0.07	0.87	0.17
EPS diluted	-	0.05	0.88	0.22	-0.01	0.07	0.87	0.17
DPS	0.0 %	0.05	0.12	0.04	0.04	0.04	0.12	0.04
Dividend Yield		2.2 %	5.9 %	1.5 %	1.5 %	1.4 %	4.1 %	1.4 %
FCFPS		-1.11	1.46	-0.53	-0.43	-0.74	1.27	0.22
FCF / Market cap		-49.9 %	71.1 %	-20.4 %	-16.3 %	-25.3 %	43.3 %	7.6 %
EV / Sales		3.1 x	0.6 x	1.6 x	2.6 x	2.4 x	0.6 x	1.1 x
EV / EBITDA		17.3 x	1.2 x	6.5 x	14.2 x	10.7 x	1.5 x	4.7 x
EV / EBIT		34.9 x	1.4 x	8.0 x	30.0 x	19.1 x	1.8 x	6.2 x
P / E		44.5 x	2.3 x	11.8 x	n.a.	41.9 x	3.4 x	17.2 x
FCF Potential Yield		4.5 %	64.0 %	11.3 %	3.5 %	6.4 %	51.0 %	14.2 %
Net Debt		174.2	-20.1	-14.1	33.7	91.9	-59.1	-66.7
ROCE (NOPAT)		0.9 %	29.1 %	10.9 %	4.0 %	4.8 %	27.4 %	9.1 %
Guidance:	PNE: EBIT of EUR 15-20m; EBITDA EUR 25-30m							

Analyst

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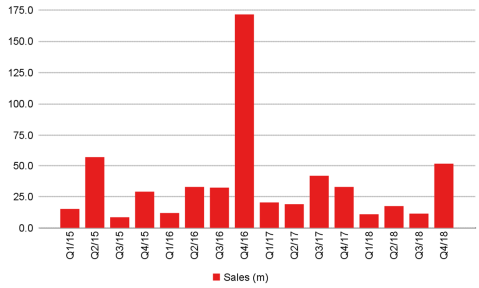
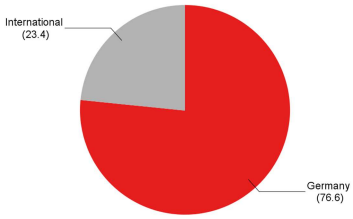
Sales development
in EUR m



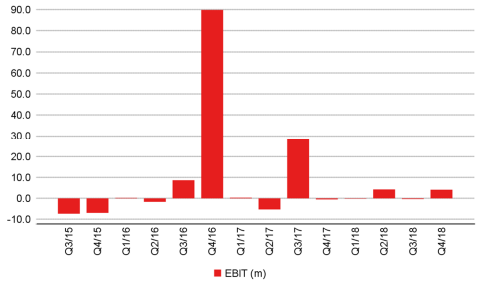
Source: Warburg Research

Sales by regions
2018; in %



Source: Warburg Research

EBIT development
in EUR m



Source: Warburg Research

Company Background

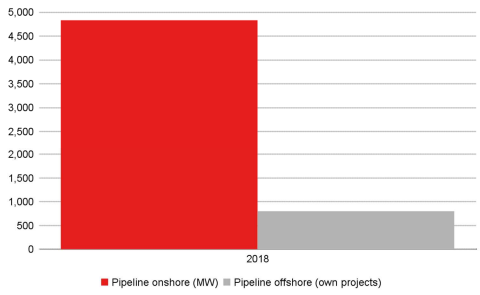
- PNE (formerly PNE Wind) is a wind farm project developer based in Cuxhaven. It is active in both the onshore and offshore markets and to a smaller extent as an Independent Power Producer (IPP).
- In the onshore sector PNE develops, constructs and sells wind farms to utilities and infrastructure funds.
- Outside of its domestic market, the PNE group is active in France, South Africa, Turkey, USA and Canada etc. In the international markets the company has over 3,500 MWs in development and in Germany >1,600 MWs.
- In the offshore sector, the company develops and sells the development rights prior to construction. The company has sold eight offshore projects in total – four of which are already in operation.
- On a very selective basis, PNE remains in ownership of the wind farms. Of the >2,900 MW of onshore wind farms developed, the company owns 76.9 MW. PNE develops a 200 MW portfolio for sale in 2020.

Competitive Quality

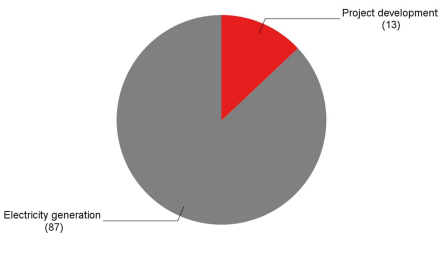
- PNE's core skills lie in the development, project management, realisation and financing of wind farms and their management, or sale with subsequent service.
- PNE's strengths lie in the development and sale of wind farms even in difficult market conditions, supported by its onshore and offshore track record.
- PNE has a competitive advantage in serving every step of the value chain. It also benefits from the cooperation with strong partners such as Allianz Global Investors Orstedt (DONG Energy), Brookfield and STEAG.
- PNE is well managed by a very experienced team led by CEO Markus Lesser, CFO Jörg Klowat and COO Kurt Stürken.
- Over the 2011 - 2018 time period, the company achieved EUR 206 million in EBIT.

Pipeline

Pipeline
in MW

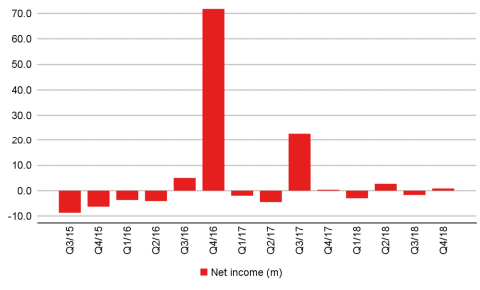


Sales by segments
2018; in %



Source: Warburg Research

Net income development
in EUR m



Source: Warburg Research

Summary of Investment Case

Investment triggers

- The scheduled sale of the 200 MW onshore wind portfolio in 2020 should result in an EBIT of EUR 69m. The portfolio currently has a volume of 71.3 MW and we expect PNE to reach roughly 95MW at the end of 2019. The remaining capacity should be added from the German and French pipeline, where several projects are already in a well-advanced stage.
- In H1/2019, PNE acquired the Papenrode wind farm in Germany for later repowering (WRe 2023). Until repowering, PNE will operate the wind farm, backed by a PPA. We expect PNE to acquire further wind farms in 2020 and 2021, resulting in a well-filled pipeline in the medium term.
- In the course of PNE's international expansion, the company successfully entered the Panamanian market with the acquisition of an existing pipeline. We expect the first sale of a project in Panama in 2020 and further expansion into Latin America in 2021.

Valuation

- The shares continue to trade below book value (WRe: EUR 2.94 for FY 2019), despite the company's long-term average ROE of 11.6% between 2008 and 2018. In light of PNE's return generation and the scheduled portfolio sale, we deem a discount to the book value to be unjustified.
- As an alternative valuation approach, we cautiously estimate the value of PNE's probability-weighted onshore project pipeline at an EBIT of EUR 312m or EUR 4.00 per share. We regard this figure as a floor value, as it does not consider the sale of already commissioned wind farms in the 2020 portfolio (EBIT of EUR 24.6m) and does not account for new projects that will be added to the pipeline in the future.
- Our price target, however, is based on an absolute DCF valuation, which indicates a fair value of EUR 4.30 per share. We advise against a relative valuation due to the company's rather volatile profit generation, which is exacerbated by the current expansion of the European onshore wind portfolio.

Growth

- We expect PNE to capitalise on its well-filled international onshore wind project pipeline, especially in Germany, France, Sweden, Poland and the US. Further growth will be driven by PNE's expansion into Latin America, where the company bought a project pipeline in Panama in 2019.
- In light of the portfolio sale in 2020, we expect PNE to deliver its strongest result with sales of EUR 284m and EBIT of EUR 88.7m. For FY 2019, our estimates reflect the development of the 200 MW portfolio, characterised by higher costs and deferred earnings. Nevertheless, PNE was able to sell several large-scale projects in H1/2019 and thus should easily reach its guidance for 2019 of EUR 15-20m EBIT.
- Additional market potential results from repowering projects. For Germany alone, we expect a yearly volume of at least 2 GW of onshore wind projects to enter the market from 2020 onwards.
- In general, we expect the market for renewable energy projects to accelerate in the coming years, driven by further decreasing LCOE and PPAs replacing state subsidies. In addition, the market for hybrid projects (power generation and storage) and power-to-gas is expected to grow as a consequence of a higher share of renewable energies, whose power production is rather volatile.

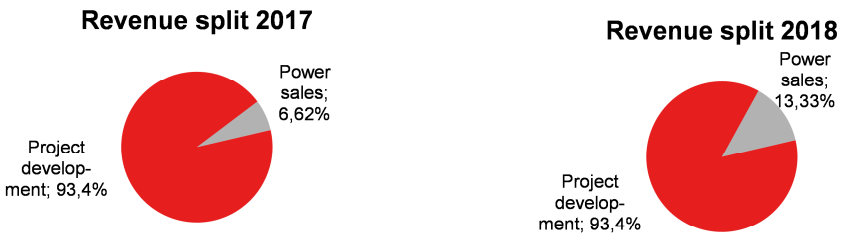
Competitive quality

- PNE is a leading project developer for onshore wind projects with a top-class track record of more than 2,900 MW.
- In addition, PNE is Germany's most successful offshore wind developer, with four projects with a total capacity of 2,644 MW sold to renowned customers such as Ørsted and Vattenfall.
- In addition, PNE is the second largest German wind O&M manager with a total capacity of more than 1,500 MW under service and aims to expand its portfolio to at least 2,200 MW by 2023.

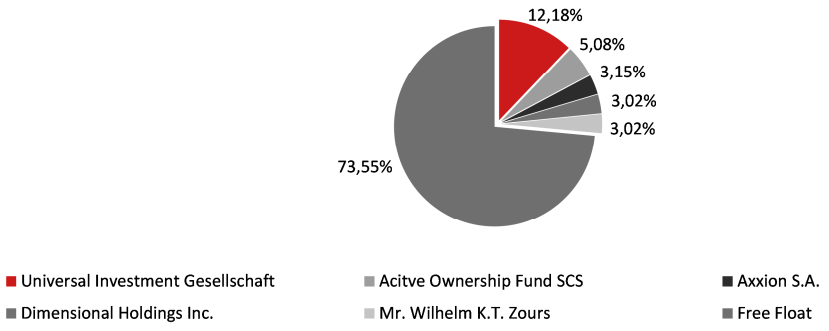
Company Overview

PNE	Project Development	Power Generation	Services
Business Segment	PNE covers the whole value-chain from land acquisition to planing, approval and execution. For on- and offshore wind, PNE already has a proofen track record and aims to extend ist activities towards PV and power to gas.	Electricity sales from wind farms owned by PNE, bought for repowering or remain on PNE´s book for later sale pooled in the Power Generation segment	Introduced in Q1/2019, this segment contains all service activities of PNE, mostly the O&M business. In the future PNE will report other service activities like consulting on financing or construction in this segment.
Competitors	wpd e.v., Energiekontor, juwi Holding AG, ABO Wind, BayWa r.e. Wind GmbH, Ostwind GmbH,	Encavis AG, 7C Solarparken AG, Energiequelle, Enertrag	Engie, UKB, EnBW, Energiekontor, ABO Wind, BayWa r.e. GmbH, NWS GmbH
Customers	Vattenfall, Dong Energy, Encavis, Allianz Global Investors, EnBW, Stadtwerke München	Energiequelle, EnBW, innogy, local ultility companies	Vattenfall, Encavis, Dong Energy, Stadtwerke München, Allianz Global Investors
Revenue Q1/2019	19.965 mEUR	4.714 mEUR	3.289 mEUR
Revenue FY 2018	79.196 mEUR	12.183 mEUR	-
EBITDA 2018	11.964 mEUR	13.244 mEUR	-
EBIT 2018	9.113 mEUR	7.386 mEUR	-
Ø EBIT last 5 years	25.019 mEUR	5.360 mEUR	-

Group Sales split 2018 vs. 2017



Shareholder structure (As of July 2019)



Source: Warburg Research

Competitive Quality

- Strong track record with 2,900 MW of realised projects in onshore wind and 2,644 MW of successfully sold offshore projects
- Leading market position in O&M business with more than 1,500 MW under service
- Implementation of “Scale up” strategy secures future market positon and strengthens PNE’s competitive advantage
- Positioning on the value chain for project development strengthens market position and drives future profitability

Leading market position in onshore and offshore project development

Top-class track record in project development

A project developer’s competitive quality is reflected in its track record of realised and successfully sold projects. This demonstrates its ability to successfully deal with local conditions and legal requirements whilst delivering economically attractive projects. With more than 2,900 MW of realised onshore wind projects, PNE is one of Germany’s leading onshore wind developers.

Track record of project developers

Company	Founding year	Installed capacity	Type	Countries
PNE / WKN	1995	~ 5,544 MW	wind (on-, offshore)	International
juwi Holding	1996	~ 4800 MW	wind & solar	International
wpd	1996	~ 4,400 MW	wind (on-, offshore)	International
ABO Wind	1996	~ 2600 MW	wind, solar , boimass	International
BayWa r.e.	2009	~ 1,400 MW	wind	International
Energiekontor	1990	~ 1,000 MW	wind (onshore) & solar	Europe

Source: Company Websites, Warburg Research

In offshore wind projects, PNE is Germany’s most successful project developer with eight sold projects totalling 2,644 MW. With the commissioning of Borkum Riffgrund II in H1/2019, four of the sold projects are already in operation.

Sold offshore projects developed by PNE

Project	Zone	#WEA	Total MW	Buyer
Borkum Riffgrund 1	1	78	312	Ørsted (DONG)
Borkum Riffgrund 2	1	56	448	Ørsted (DONG)
Gode Wind 1 & 2	1	55 + 42	582	Ørsted (DONG)
Gode Wind 3 & 4	1	30	242	Ørsted (DONG)
Atlantis I	2	73	584	Vattenfall
HTOD5 (Nautilus II)	4	68	476	Ventizz/Hochtief
		402	**2,644.00**	

Source: PNE, Warburg Research

This especially underlines PNE’s competence in project development, as the complexity and size of offshore projects is significantly higher compared to onshore projects. Offshore projects are sold in the status of granted permission. The final investment decision by the respective investor is made after purchase of the project and depends primarily on the quality of the planned projects in terms of economic attractiveness and feasibility.

Germany's second largest O&M provider

Complemented by a strong market position in the O&M business

Besides the project development business, PNE provides O&M services for the operation of wind farms. This includes:

(i) Technical and commercial administration of wind farms

(ii) Monitoring and reporting

(iii) Coordination of maintenance and repairs

(iv) Measures to extend the service life of the installation

With more than 1,500 MW under service, PNE is the second largest O&M manager in Germany. Usually, PNE provides Operation and Management services for its sold wind farms, which secures further growth perspectives and market access. As most of PNE's costumers are looking for a turnkey solution, they are willing to enter O&M contracts. The growing volume under management can be seen as a sign of the high quality PNE is able to provide to its customers and also a sign of customer satisfaction, as most service contracts run for 10-20 years.

Regarding the cost base for O&M services, the business is rather scalable. The monitoring and commercial administration of the wind farms can easily be centralised. With a higher volume under service, the utilisation of the mobile service teams increases, enabling PNE's O&M business to offer its services at highly competitive prices. In terms of maintenance contracts or repair orders, PNE is able to benefit from its long-standing relationship with several wind turbine suppliers and its industry know-how.

In addition, the O&M unit collects data and know-how on different types of turbines, their error rate and maintenance intensity. This in turn supports the project business unit in selecting the right turbine for the right environment and increases the accuracy of project calculations.

New strategy extends business activities

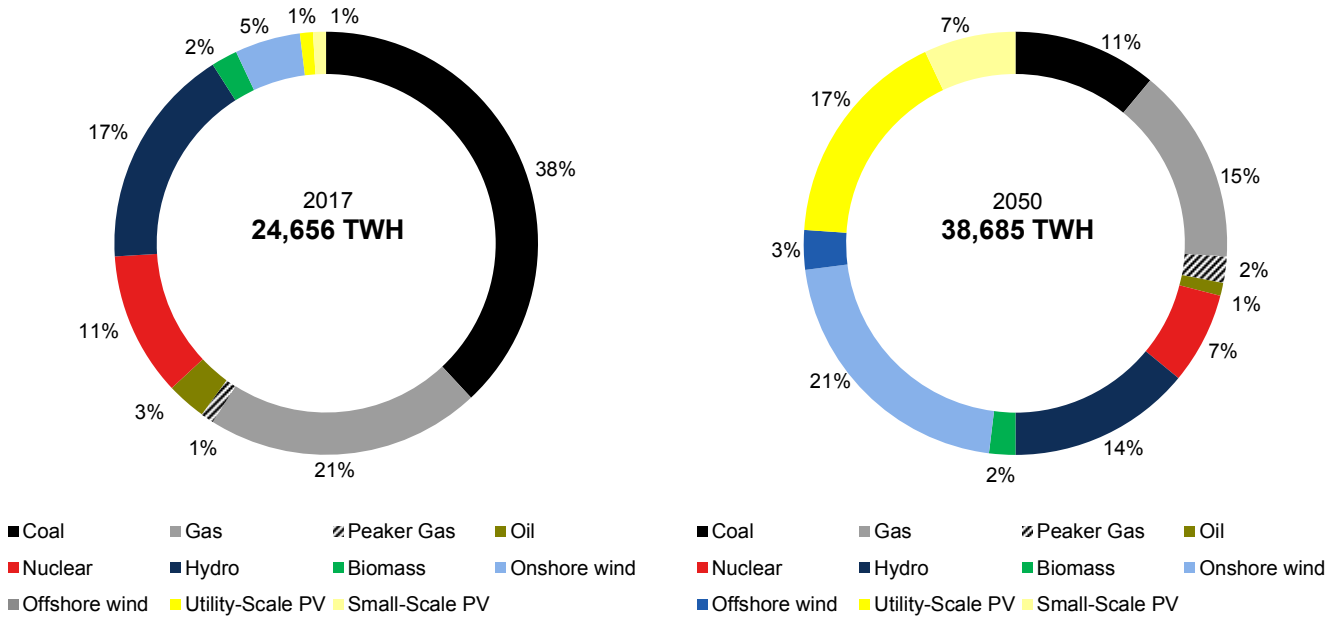
PNE's new strategy in a nutshell

In 2017, PNE unveiled its new strategy named "Scale up" to prepare the company for further business opportunities, anticipate future market developments and strengthen its market position. Reflecting the change of its business model, PNE now stands for "Pure New Energy".

New technologies expand the product range

The core element of PNE's new strategy is the extension of its project activities regarding PV, energy storage and power-to-gas. As PV and onshore wind are the current technologies of choice to increase renewable energy generation worldwide, both technologies have enormous growth potential for the years to come.

Capacity projection for international energy production



Source: BNEF, Warburg Research

Storage technologies and power-to-gas are not yet relevant markets, but with ongoing changes in the power market (see chapter "Growth") they should provide PNE with significant future growth potential. With regard to PNE's value chain, the combination of power production (wind and PV) with integrated storage and/or transformation (power-to-gas) units increases the value added and thus the attractiveness of the business model. This should lead to:

(i) Higher margins for integrated projects (turnkey-ready).

(ii) With a broader technology focus on a growing market, PNE can strengthen its market position and competitive edge.

Extension of service activities

PNE aims to increase the income from its service business unit to reduce earnings volatility. Besides the current O&M services, PNE will provide engineering and financing solutions without being the original developer of a particular underlying project. The company targets 2,200 MW under management (Q1/2019 >1,500 MW) by 2023 for its O&M business. Additionally, PNE seeks to acquire or invest in service companies that provide special service solutions, such as MEB Safety Services GmbH (safety technology for wind turbines and industrial facilities) and argus GmbH (night identification for wind turbines).

International expansion

In addition to current core markets such as Germany, France, Poland, Sweden and the US, PNE plans to enter new (emerging) markets. The first steps have already been successfully taken in 2019 with the acquisition of a project pipeline of 352 MW in Panama. In general, PNE seeks emerging markets that are likely to experience significant growth in energy demand, have favourable conditions for renewable energies and are politically and economically stable.

New financial targets

Turning the new strategy into figures, PNE intends to boost its yearly project output to more than 400 MW per year accompanied by 2,200 MW under management (O&M). For the acquisition of pipelines, companies or wind farms with repowering potential, annual capex of EUR 10m is earmarked. By 2023, this should lead to a 30-50% EBIT increase

compared to the average for 2011-2016 (EUR 29.2m). This implies an EBIT target of EUR 37-44m. We expect an EBIT of EUR 26.38m in 2023 (DCF-based), as we do not consider possible operative developments (see chapter "Valuation"). For 2019, PNE targets an EBIT of EUR 15-20m and an EBITDA of EUR 25-30m.

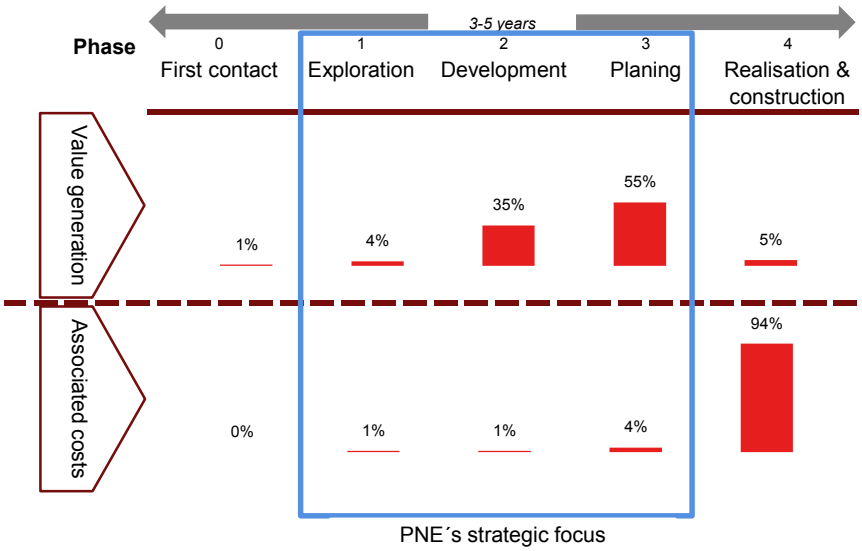
Position in the value chain supports profitability and lowers risk

New strategy secures market position

Well located in the sweet spot of the value chain

The value creation along the different development stages of renewable projects is rather unevenly distributed. The biggest value-adds are development and planning, including a detailed planning process, site selection and analysis as well as the approval process.

Allocation of value creation over the course of a project

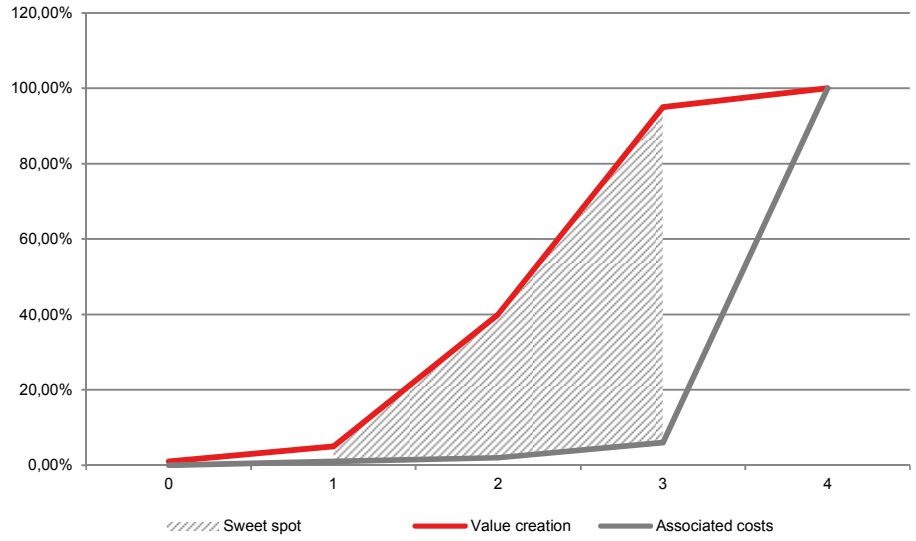


Source: PNE, Warburg Research

In contrast, capex for these stages is comparatively low and mostly determined by personal expenses, fixed fees for approvals (e.g. building permits) and assessments (wind, nature and environmental analysis). By far the largest portion of capex is required in stage four with the construction of the project (material costs).

Comparing value added and capex, the sweet spot of project development lies between stage one and three, where the highest value added meets minimal capex requirements.

Sweet spot of the value chain



Source: Warburg Research

A wider range of technologies and a more service-oriented approach, triggered by PNE's new strategy, are the key to this allocation and should drive future profitability. In addition, this underscores PNE's strategy of selling projects outside of Germany prior to construction. This minimises project risks in terms of capex, but most of the value creation is realised.

Broader range of technologies increases competitive edge

Transfer of core competencies shapes competitive edge

The core competence of a project developer is the development of economically attractive projects under different local regulatory conditions, which is also reflected in the value creation as described above. For a better differentiation, this can be divided into:

(i) Acquisition: Securing a potential location where conditions allow the development of a competitive project.

(ii) Planning: Detailed planning of the project including the selection and coordination of suppliers taking into account local conditions and regulations.

(iii) Approval: Coordination with local authorities and the project goes through the entire approval process.

(iv) Financing: Raising the needed funds for project realisation, including the selection of a suitable bank or project financer.

(v) Sale: Using a network of investors (pension funds, utility companies, independent power producers (IPPs)) to sell the project at an attractive price.

(vi) Construction: Acquisition of building components (e.g. wind turbines), coordination and monitoring of the construction process.

For onshore and offshore wind projects, PNE already has a proven track record. By expanding the range of technologies, PNE can easily transfer its know-how to other technologies, as most of the steps are the same or similar. Employing its local teams, connections to local authorities and the supplier network as well as market entry in PV and power-to-gas projects are easily possible.

The application of additional technologies is key to the development of smart grid solutions based on connected technologies (sector coupling). We regard this step as essential because:

(i) With the focus on wind projects alone, PNE would potentially miss out on significant growth opportunities.

(ii) As a consequence of PNE's existing know-how, adding new technologies should not pose a major risk.

(iii) Costumer demand is set to shift to hybrid solutions (i.e. power generation and storage).

(iv) Offering more sophisticated solutions, PNE should achieve stable or higher margins.

(v) As a first mover in connected technologies, PNE should be able to monetise its knowledge as it gains a competitive advantage.

We regard the extension of PNE's product range as essential for its future growth perspectives and market position. As described in the chapter "Growth", the market for renewable energies is developing towards more complex and connected solutions. Thus, narrow focus on a single technology means that growth potential is missed. The acquisition of knowledge about new technologies enables PNE to develop connected solutions for the future, which is essential for securing its market positon and continuing its first-class track record.

Higher share of services reduces earnings volatility

Reduction of volatility triggers profitability improvement

PNE's sales and EBIT generation was rather volatile in the past, which is quite normal in the project business. To reduce volatility, PNE aims to increase the income from its O&M business and provide services for projects independent of the ownership of the underlying project. We see several advantages in this approach:

(i) The O&M business generates a comparably stable income, as service agreements for wind farms are usually based on multi-year contracts. With an increasing volume under management, we expect profitability to increase as O&M is highly scalable.

(ii) Project services tend to be more volatile (compared to O&M services), but are generally easier to plan compared to project development due to a shorter lead time. In addition, services are expensed periodically and are not back-end loaded as is the case with project development.

(iii) Projectable recurring revenues allow for the acquisition of additional project rights, project pipelines and/or international expansion.

(iv) Predictable income allows for better refinancing conditions, resulting in low interest expenses in project development. This improves either PNE's margin or the competitiveness of its projects.

(v) As of Q1/2019, PNE is reporting its service business in a separate segment, increasing the visibility of its business model for both investors and banks.

As a consequence of increasing service revenues and lower interest expenses, we expect a slight margin improvement for project development and O&M services.

Growth

- Transformation of the power market opens up new business opportunities as it extends the value chain
- Declining LCOE ("Levelised costs for electricity") for onshore wind and PV power foster growth as renewable energy is becoming more competitive
- Power purchase agreements (PPAs) replace state subsidies and thus reduce dependence on regulatory schemes
- Repowering of old wind farms adds additional project volume
- Expansion into emerging markets enables additional growth

Decentralised power market extends possibilities for value creation

Transformation of the power market

Energy market has to meet additional future requirements…

(i) Exit from fossil and nuclear power generation: With the ratification of the Paris Climate Agreement, most countries (excluding the US) agreed to stop or at least reduce energy production from fossil sources (coal, oil and natural gas). Therefore, the same standards in terms of supply reliability and grid stability will have to be met for energy production from renewable sources in the future.

(ii) Decentral power production: To maximise production, renewable power plants are built according to favourable wind/solar radiation conditions. This does not take into account the demand situation in the area of the respective plant (existence/absence of large consumers). In addition, PV rooftop installations or small wind turbines held by locals ("Bürgerwindpark") either cover the local power demand or produce in excess of it. This results in a very different requirement profile for the power grid in terms of transfer, storage and peak feed-in compared to what we have today.

(iii) Power conversion: For storage means or the use in other applications, renewable electricity can be converted into a number of other energy sources (e.g. the production of hydrogen or methane).

(iv) Sector coupling or integrated energy system (power-to-x, electricity, heating and mobility are interconnected): Without the use of fossil fuels, the primary source of energy is electricity. To cover other needs (heat and mobility), electricity needs to be transformed.

(v) Power storage as a consequence of volatile power generation: Wind and PV power production depend on the availability of wind and solar radiation. Thus, supply is not necessarily in sync with demand. As a consequence, storage solutions are required to align availability with demand on a 24/7 basis.

(vi) E-mobility and other sustainable mobility concepts: Alternative mobility solutions (fossil fuel free mobility) add additional challenges to energy production, storage and grid stability.

(vii) Energy management by smart applications (smart grid): To meet the challenges of volatile production and demand and thus ensure supply reliability, algorithms can be used to smooth energy demand and better link energy availability with energy demand.

…which extend the value chain…

The current value chain for renewable energy projects is divided into three to four main areas:

1. Project development: Includes the acquisition of land, project planning, approval procedures, financing and construction
2. Equipment manufacturing: Design and manufacturing of parts (wind turbines, solar cells etc.)
3. Plants operation and power sales
   - 3.1. Operation and management (O&M): Includes services related to the operation of the plant like coordination of repairs or maintenance work
   - 3.2. Power sales: The plant owner either sells all of the produced power or uses it for his own purposes

The targeted power market developments result in an extension of the respective value chains:

1. Project development extends towards power-to-x and storage solutions. This results in the use of various additional technologies that have to work hand in hand with the power plant. As a consequence, the focus will shift to connected technology developments (hybrid solutions) like PV parks which are build ready to storage (with the possibility to add storage technology) or wind farms with a power-to-gas system attached.
2. For equipment manufacturers, a wider range of technologies leads to new products. Besides new and more efficient products, companies will compete against each other with their connectivity solutions (e.g. on intelligent or smart interfaces).

For O&M and power sales, the complexity of controlling and interaction should increase. The use of smart applications for distribution, sales and monitoring will be a decisive factor for profitability as they can reduce fixed costs.

Complexity opens up new service opportunities

…and open up new business opportunities

With the increasing complexity of the value chain and the power market, business models can be enhanced by adding services such as:

- (i) Smooth and loss-free transfer of energy between production and storage
- (ii) Sector coupling including energy conversion (power-to-x)
- (iii) Design and planning of integrated power plants (wind and PV connected to storage and transformation units)
- (iv) Linking of existing plants
- (v) Construction of turnkey-integrated projects (as described in (ii))
- (vi) Operation of virtual power plants and micro grids in addition to conventional O&M services
- (vii) Data analysis and programming for smart grids
- (viii) Grid extension and planning

For PNE, this leads to a more service-centred business approach employing several technologies (as reflected in its new strategy). In the short term, PV projects should have additional growth potential as they:

- (i) are as profitable as onshore wind projects in terms of power production
- (ii) require less capex compared to wind projects due to lower module prices and construction costs
- (iii) have a comparably short construction and approval process, which allows higher project turnover

We believe PNE is well positioned to benefit from a growing PV market in Germany and France thanks to its well-established network of authorities, investors and communities. For larger PV plants without state subsidies, we expect PPAs to be a main driver in the coming years (see chapter “Growth”).

Besides Germany and France, the PV expansion in PNE’s European markets is still at an early stage due to the lack of political support and cheap power from nuclear and fossil sources. However, we expect the PV market, especially in Eastern Europe, to accelerate in the future due to the development targets for renewable energies set by the European Union combined with favourable solar radiation conditions in some regions. In Poland, where PNE has already successfully sold some onshore wind projects, the government has set a PV capacity target of 1.4 GW in 2020, supported by tenders for state subsidies.

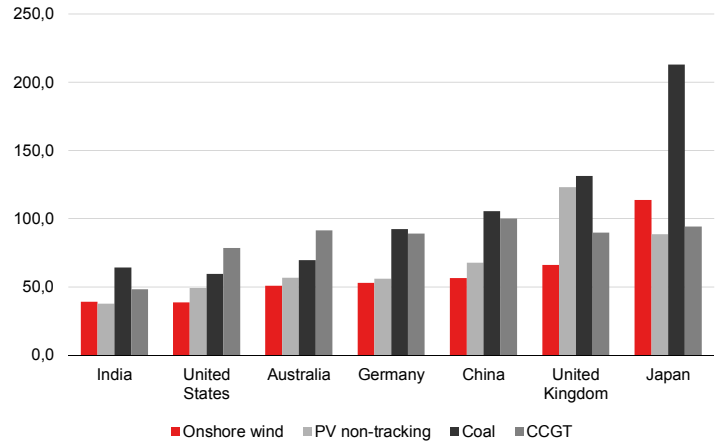
Further growth for PV but also for onshore wind should come from the US market. Although the US has withdrawn from the Paris climate agreement, several US states have decided to meet the international targets on their own and focus on the expansion of renewable energies. PNE has already successfully entered the US onshore market with the sale of the Vivaldi Springtime project and the current sale process of the Chilocco wind farm. We expect PNE to enter the US PV market in the next years after the successful sale of the first German PV projects in 2019.

Increasing financial attractiveness of renewable energies supports growth

Grid parity has become reality

All conversion costs required to use an energy source (e.g. coal, wind, solar) to generate electricity are summarised in the Levelised Costs of Electricity (LCOE). This makes it possible to compare power generation from various fuels. Without considering costs for grid connection or strategic objectives like grid stability, renewable electricity is already competitive with power generation from fossil or nuclear fuels.

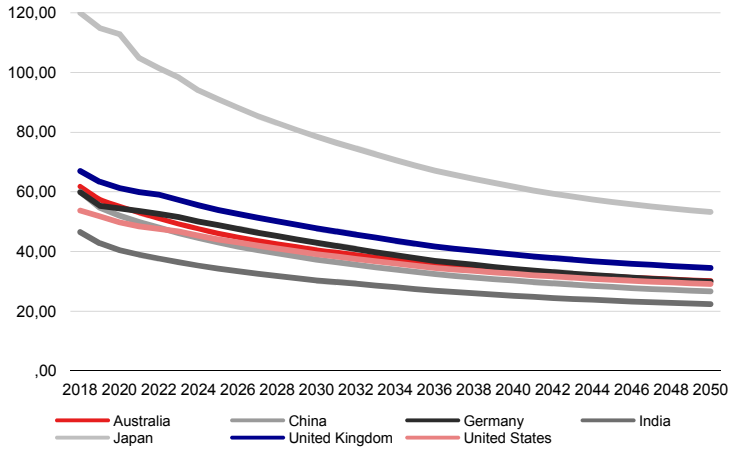
Current LCOE in USD/MWh



Source: BNEF, Warburg Research

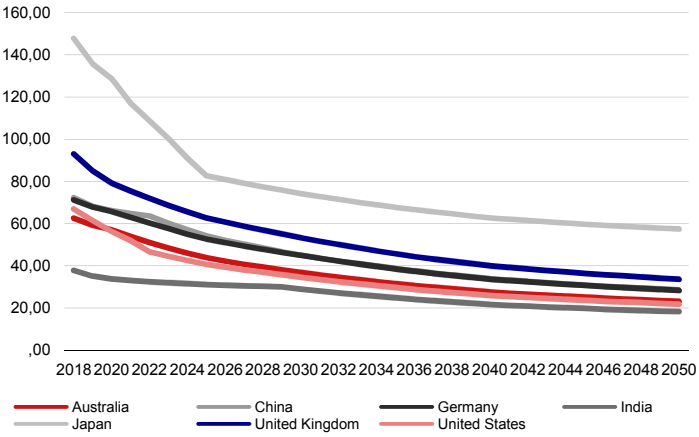
Based on Bloomberg New Energy Finance (BNEF) data, the LCOE for renewable energy should continue to decline in the future.

Expected development of LCOE for onshore wind (USD/MWh)



Source: BNEF, Warburg Research

Expected development of LCOE for non-tracking PV (USD/MWh)



Source: BNEF, Warburg Research

Renewable energy is already the cheapest form of power generation in all major energy-producing countries except Japan. The continued downward trend in the renewable energy cost curve is the result of:

(i) Technological progress in the improvement of wind turbines/PV cells and inverters

(ii) Increasing efficiency, especially regarding wind turbines and inverters

(iii) Declining equipment prices

(iv) Costs for maintenance and operation decline due to smart maintenance and the use of new technologies (e.g. drones with thermal imaging cameras are used to scan PV plants)

In contrast, we expect increasing LCOE for power from fossil fuels in Europe as a result of increasing prices for CO_2 emissions under the third phase of the EU Emission Trading Scheme. As the USA under Donald Trump decided to exit the Paris climate agreement, we do not expect any regulatory pressure on fossil power production in the US. Nevertheless, we see good prospects for a substantial expansion of renewable energies:

(i) Wind and irradiation conditions in various US states are ideal

(ii) Extension of Production Tax Credit (PTC) and Investment Tax Credit until 2020

(iii) Large uninhabited areas with favourable conditions for wind or PV energy production

(iv) Commitment of several US states to fulfil emission targets independent of central government

Problems regarding power availability and grid stability require the development of storage solutions for solar and wind power. This is a major stumbling block for the industry as the share of renewable energy production increases. Expectations for global storage deployments are that growth will accelerate from 2022 onwards, supported by:

(i) Declining battery prices

(ii) Residential PV supplemented by battery storage (behind-the-meter storage)

(iii) Decentralised and smart grids

Therefore, we expect the development of storage solutions to be another supportive driver of sustainable energy market growth.

PPAs drive market growth and underline financial attractiveness

Paving the path for PPAs

As LCOE for electricity from renewable sources are on par with conventional energy, and government subsidy schemes for renewable energy production are expiring in various countries, power purchase agreements (PPAs) become attractive for both private entities and energy suppliers. In these arrangements, consumers enter purchase agreements with a power distributer for a period of 5-20 years, agreeing to buy a fixed amount of electricity at a fixed price. There are numerous advantages for both sides:

(i) Buyer eliminates price risks related to future energy costs

(ii) Project developers and operators improve the visibility of cash flows

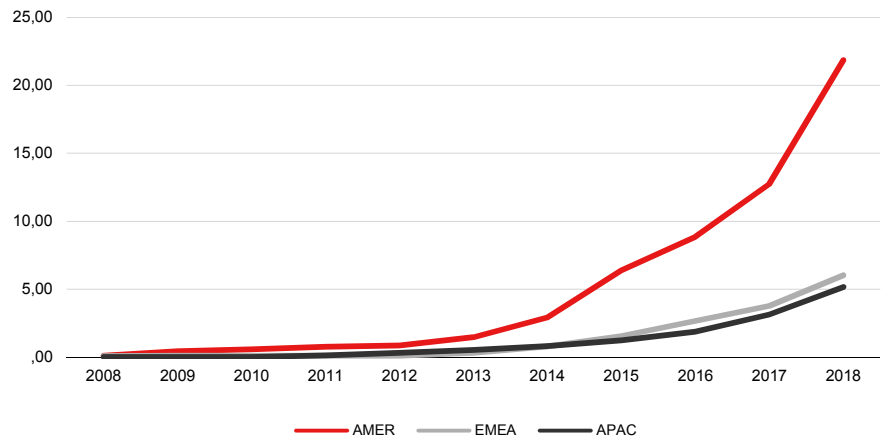
(iii) As predictable cash flows are important for investors and/or lending banks, financing of projects can be achieved at attractive conditions

(iv) Dependence on subsidies, regulatory requirements and building restrictions disappears, which improves the feasibility of projects

(v) PPAs secure legal certainty for both parties and include compensation rules

In markets with favourable conditions for solar/wind power like the US, the volume of new PPAs is already increasing exponentially. We expect a similar development for Europe over the next few years, as first PPAs were signed in several countries in 2018.

Cumulative amount of corporate PPAs by regions in GW



Source: Warburg Research

Nevertheless, state subsidies will remain important for smaller plants and unfavourable locations, as their LCOE are above the current power price.

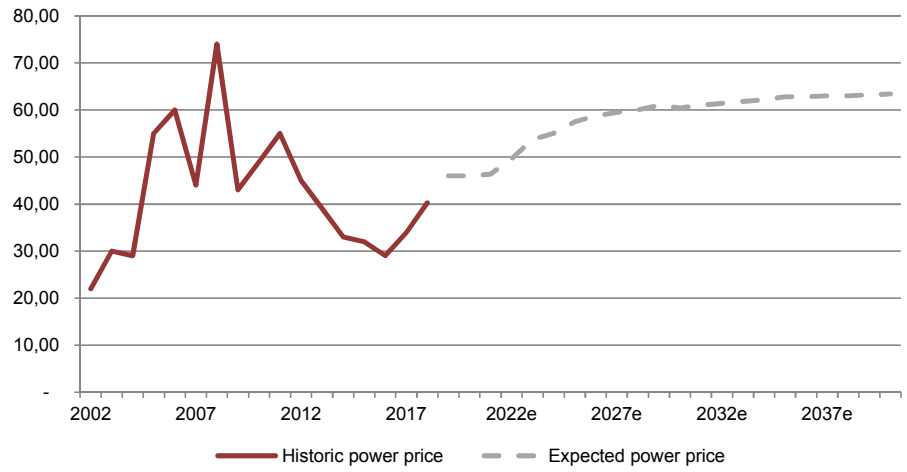
In 2019, PNE was able to secure its first wind-based PPA in Germany for the Papenrode wind farm. We expect PNE to announce further PPAs on the German market not only for wind but also for larger PV plants. The US pipeline should be developed through PPAs, as these are already established in the US. In 2016, PNE successfully signed a PPA in the US with a local supplier as part of the Vivaldi Springtime project, proving its ability to develop PPA-eligible projects.

Increasing power prices and PPAs replace subsidies

Additional support from expected power price development

In view of the power price forecasts of several institutes and companies for the German market, we expect increasing electricity prices. As subsidy levels will decrease, they will fall below the market price and are therefore not necessarily needed to develop profitable projects.

Expected development of power prices in Germany



Source: 7C Solarparken AG, PNE AG, Brainpool Energy, ICIS, Aurora Energy, AGORA, Warburg Research

For future projects, this development will support profitability and the attractiveness of PPAs and increase the probability of project realisation. In combination, PPAs and increasing power prices are able to replace subsidies for renewable energies.

As the selling price of a project is derived from its future revenue generation, an increasing power price supports PNE's project margins or can at least be used as a buffer against decreasing selling prices.

Repowering adds additional market potential

Hidden market potential of wind farm repowering

After 20 years of operation, a wind turbine can either be decommissioned, the operating permit can be extended or the wind turbine can be repowered. During repowering, the turbine will be replaced but with considerable advantages:

(i) Grid connection is already available

(ii) Based on technical progress, the number of turbines can be reduced while the installed capacity remains constant, or capacity may be increased using a similar number of turbines

(iii) Site access for components and construction equipment is readily available

(iv) As a building permission was already granted for the original turbine, the probability of obtaining a new permission is very high

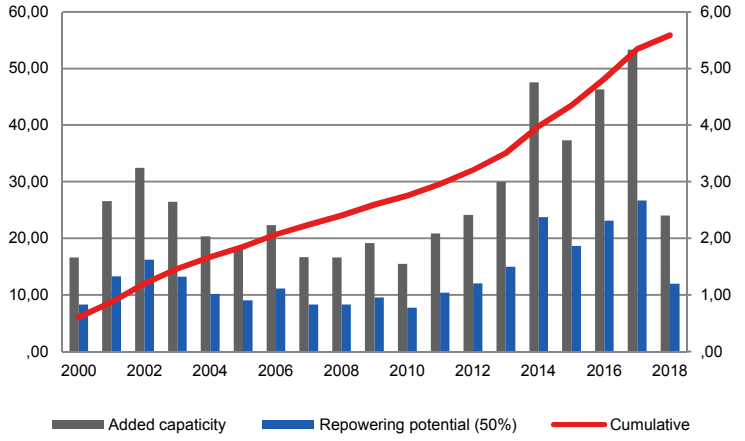
(v) Locations with favourable wind conditions can be equipped with more

powerful turbines

(vi) Acceptance of an already existing wind farm by people living in the area tends to be higher compared to a new one, so lawsuits and delays are less likely to occur

For its domestic market Germany alone, PNE expects an annual repowering potential of around 4 GW from 2021 onwards. Our repowering potential estimate is rather conservative at 1-2 GW per year based on capacity additions between 2000 and 2010.

Historical onshore wind installations in Germany (GW)



Source: BWE, Warburg Research

Our repowering estimates for 2020 are based on the yearly capacity additions 20 years ago. Of these, we include 50% in our estimates due to regulatory changes. Nevertheless, we regard our estimates as conservative:

(i) The replacement of old wind turbines with today's state-of-the-art turbines automatically increases the capacity for power production. In 2001, the average installed wind turbine in Germany had a maximum output of 1 GW, while the latest onshore wind turbines of today achieve a maximum output of 4-4.5 MW.

(ii) We expect the historical installed capacity to remain at least at the same level. Otherwise, net additions per year could probably decrease in the future, which is not the intention of the government.

O&M activities ensure access to potential repowering

Best access through strong O&M business

As one of the largest German O&M managers, PNE is in a favourable position when it comes to repowering. As PNE is in permanent contact with the site owners and gathers all data of the respective sites, it is always one step ahead of the competition when it comes to identifying a potential for repowering.

Most O&M clients only operate wind farms and have no own project development units. Thus, they are not interested in executing a repowering project on their own. The acquisition of repowering projects, which are highlighted by its O&M activities, should be rather easy for PNE.

In contrast, the acquisition of a repowering project PNE has no ties to is more competitive. In case another project developer provides O&M services for a wind farm, we consider the acquisition of the repowering project to be very difficult. For all other external projects, PNE's market position and competitive quality should pay off. PNE is very well known for its expertise in the development of onshore wind projects and can rely on a well-established network of investors and power producers to offer repowering at attractive conditions to the current operator of a wind farm.

PNE's repowering strategy

With the acquisition of the Papenrode wind farm in 2019, PNE has shown its ability to secure repowering projects and enter into PPAs. The government-guaranteed feed-in tariff for the wind farm expires in H2/2019, but PNE was able to close a PPA with LichtBlick SE, allowing future profitable operation for three to four years.

During this period, PNE can already initiate the repowering process, including planning, permission and refinancing. Meanwhile, the Papenrode wind farm produces stable cash flows, which can be used to cover project development costs. We regard this approach as a smart way to secure a future project pipeline with high visibility that is (at least partly) self-funding.

This strategy is not mandatory for PNE in the future, but from our point of view it is a very good way to secure projects beyond the O&M universe. The purchase of a project a few years before repowering withdraws the project from the market before it comes into the focus of competitors. We expect PNE to buy further repowering projects in the next years within the planned capex of EUR 10m for the implementation of the "Scale up" strategy

Expansion secures long-term growth opportunities

Emerging markets expansion should pay off

PNE's expansion into new (emerging) markets opens up regions with favourable solar radiation and wind conditions. Especially South American regions like Patagonia (wind) or the Atacama desert (solar) have outstanding conditions for renewable energies. In addition, several of those regions contain large hydropower capacities, which can be used as natural power storage systems. A big issue for most Southern American countries is the development of a stable and reliable grid overall and the provision of a grid connection to more remote regions. Thus, renewable energies can be seen as a part of the solution as they produce decentralised power close to the consumer, which provides a certain level of grid independency.

Countries like Brazil, Argentina, Chile, Colombia or Peru already try to utilise their potential for renewable power generation to cover the increasing electricity demand of its growing economies.

We expect the Southern American market to generate significant future growth but also a higher risk profile in terms of political and economic stability. To avoid or minimise those risks, PNE will develop those markets with the help of strong local players, providing them with primary services such as planning or consulting without taking the construction expenses on its own books. In addition, PNE will use state subsidies or expansion support provided by KfW, Hermes, EIB or international subsidy programmes.

The first South American market PNE entered was Panama in 2019, with the acquisition of a project pipeline containing several projects, of which the majority have already received approval. As there are no tenders for subsidies, we expect PNE to develop its pipeline using PPAs with local suppliers. Panama is one of the fastest growing economies in the world and home to the South American headquarters of numerous international corporations. It provides a sound legal protection as well as a democratic and stable political environment. Thus, we regard Panama as a good hub for PNE to expand its Latin American business.

We expect first revenues from the Panama pipeline in 2020. However, while PNE's increasing presence in South America should pay off in the long term, we are far from expecting a massive impact in the short term.

Financials and Returns

- Sale of high-volume projects in Sweden, Poland and the US to drive earnings in FY 2019
- Well-filled international onshore pipeline secures revenue generation in the long run
- Sale of the 200 MW European onshore portfolio in 2020 seems likely and should generate a high margin
- Return generation should be seen in the light of project cycle averages
- Strong historical average ROCE of 10.7% p.a. underscores operative excellence and is well above cost of capital
- Average ROE generation indicates an unjustified discount to book value

Characteristics of the business model might lead to wrong conclusions

The business model of a project developer like PNE has some special characteristics when it comes to its P&L:

(i) The total selling price/price per MW depends on the development status of the project. An already constructed project includes e.g. costs for wind turbines in the selling price. However, the margin generation during construction is very low (see chapter “Competitive Quality”) as related costs are passed on to the costumer. Consequently, top-line generation is not necessarily an indicator for bottom-line development.

(ii) Earnings generation of projects is generally back-end loaded. Depending on the technology (wind/PV/other), the period between land acquisition and sale of the finished project can add up to three to five years. During this period, project development costs are not compensated by related earnings. Thus, the profit of a given reporting period is only partially linked to the costs incurred.

(iii) It is rather difficult to assess the exact completion date of a project due to many external influences, especially from the approval process. This often leads to delays and sometimes postpones project completion to the next reporting period. Hence, revenue generation tends to be volatile. It is important to stress that earnings from a postponed project are shifted to the following reporting period and not cancelled.

Thus, the valuation metric for PNE’s operative performance is its average EBIT generation. This is in line with PNE’s guidance, which is also based on EBIT generation.

Well-filled pipeline secures high project activity

Onshore wind remains key driver

Our estimates for FY 2019–2021 are mainly based on the capitalisation of PNE’s onshore wind pipeline, which includes several international late-stage projects. Thus, PNE benefits from its international development activities, which reduce its dependence on a single market.

P&L detailed forecast

in mEUR	2017	2018	2019e	2020e	2021e
Projecting	106,53	79,20	98,20	245,25	119,20
Onshore wind			*98,20*	*19,75*	*119,20*
Portfolio				*225,50*	
Offshore wind			*0,00*	*0,00*	*0,00*
Power Generation	7,55	12,18	17,65	25,88	10,40
Services *			12,51	13,19	13,86
Total revenue	**114,08**	**91,38**	**128,36**	**284,32**	**143,45**
Changes in inventories	*63,33*	*15,06*	*13,50*	*0,00*	*0,00*
Total output	**177,41**	**106,44**	**141,86**	**284,32**	**143,45**
- Material costs	108,38	36,70	68,24	118,46	66,62
- Personal expenses	25,79	27,78	28,50	29,00	29,50
- Other expenses	24,10	30,81	23,41	42,65	21,52
+ Other income	9,48	5,35	7,20	9,00	6,40
EBITDA	**28,62**	**16,50**	**28,91**	**103,21**	**32,22**
- Depreciation	5,49	8,71	12,66	14,48	7,91
EBIT	**23,13**	**7,79**	**16,25**	**88,74**	**24,31**
Projecting	*31,01*	*9,11*	*6,70*	*7,50*	*17,88*
Portfolio				*69,00*	
Power Generation	*1,11*	*7,39*	*7,80*	*10,13*	*3,79*
Services			*1,75*	*2,11*	*2,63*
Consolidation	*-8,99*	*-8,71*	*0,00*	*0,00*	*0,00*
Financial result	-10,09	-9,81	-10,10	-10,00	-9,40
Taxes	0,33	0,05	10,16	80,01	20,73
Net income	**17,08**	**-1,12**	**5,13**	**64,65**	**12,31**

* introduced in 2019

Source: BNEF, Warburg Research

International deal pipeline pays off

Strong international onshore deal pipeline pays off

We expect PNE to deliver a strong EBIT result of EUR 16.3m in 2019, based on the sale of the following projects:

(i) Commissioning of the projects Kittlitz (20.7 MW) and Wöllsickendorf (16.8 MW) in Germany. As PNE focusses on the development of its 2020 portfolio, we expect one of the projects to be sold and the other to be transferred to the portfolio.

(ii) PNE successfully sold several very large international projects in H1/19: Malarberget (113 MW) in Sweden and Jasna (132 MW) in Poland and. All of the projects were sold prior to construction. PNE provides construction services for these projects nevertheless, which should result in recurring revenues until 2020.

(iii) In Italy, PNE was able to sell two smaller projects totalling 44 MW.

(iv) For the projects sold in 2018 – Laperriere (France, 19.2 MW), Laxaskogen (Sweden, 25.2 MW) and Barwice (Poland, 44 MW) – PNE still receives fees for construction management.

In addition to projects sales, PNE generates revenues from its growing wind park portfolio (portfolio 2020) and O&M service activities. We expect EBIT from power sales and O&M services to reach EUR 9.6m in 2019.

For 2020, we expect PNE to achieve its strongest EBIT result to date due to the sale of its European onshore wind portfolio plus its power sales. The portfolio sale should result in an EBIT of at least EUR 69m (for detailed calculation see chapter “Portfolio sale ahead”) complemented by EUR 10.1m from power generation and EUR 2.1m from O&M.

As PNE focusses on the development of its portfolio, most of the (German) projects developed in 2020 need to be transferred to the portfolio. Nevertheless, the international pipeline should deliver additional project sales (EBIT of EUR 7.5m):

(i) We expect the first project sale in Panama in 2020 with a size of 40-50 MW

(ii) The well-filled project pipeline in France should result in project sales of at least 30-40 MW.

(iii) After the sale of Malarberget in 2019, we expect the sale of further projects in Sweden in 2020/21.

For 2021, the visibility of project sales decreases significantly. However, we expect international project activities to remain at a high level. PNE aims to quickly refill its total project pipeline (in MW) already in 2021 after the huge portfolio sale of 2020. Our estimates are based solely on the sale of projects in PNE's already established markets Germany, France, the US and Sweden, resulting in an EBIT of EUR 17.9m.

With the sale of the 2020 portfolio, power generation drops significantly impacting earnings from power sales negatively. We expect PNE to acquire further wind farms for repowering, which will lead to a growing capacity as these repowering projects are likely to remain on PNE's books for two to three years. Our estimates for power generation do not reflect additional acquisitions in 2020/21.

Additional upside to our estimates could result from PNE's already sold offshore project Gode Wind 4. PNE still expects a milestone payment of EUR 15m from Ørsted. The payment is triggered by Ørsted's final investment decision, which is expected in 2021. We do not include this milestone payment in our estimates as we are unable to make a substantiated estimate regarding Ørsted's decision. Nevertheless, as soon as the visibility of the milestone payment improves, we expect a significant increase of PNE's 2021 EBIT, as the received payment will incur virtually no related costs in 2021 and will therefore have a direct impact on EBIT.

Further upside potential could arise from a rapidly developing PV project business, where we expect first significant revenues in 2023. The market entry in Panama could lead to the acquisition of further project pipelines in Latin America, which should boost earnings generation.

Cost structure reflects asset-light business model

PNE's fixed-cost base is primarily determined by personal expenses. Expenses for material, financing and also depreciation are directly related to a project in development. We expect PNE's personal expenses to increase slightly due to high international project activities. In our calculation, material costs are linked to projects, which are sold turnkey-ready. With regard to PNE's interest expenses, the refinancing of its early-stage pipeline (projects in an early development stage) and group-owned wind farms is covered by its outstanding bond (coupon 4%), while projects in an advanced stage or under construction carry short-term debt (credit facility) or project financing, which is non-recourse. Depreciation, in turn, occurs from PNE's fixed-asset base, primarily group-owned wind farms. Our calculation reflects the increasing number of parks held on PNE's books due to the portfolio sale in 2020. As some of the parks (currently 71.3 MW) are already commissioned in 2018/2019, they have to be recognised in PNE's fixed assets.

Portfolio sale of 200 MW allows for higher margin generation

Portfolio sale ahead

In this section, we provide a detailed overview of our calculations for the planned portfolio sale in 2020:

After the successful sale of its 142.5 MW portfolio to Allianz Global Investors in 2016, PNE decided to continue its portfolio strategy, which bundles a large number of small to medium-sized wind farms into one large portfolio. In 2020, PNE aims to sell a portfolio of 200 MW, which includes 71.3 MW of German onshore projects in H1/2019. We expect PNE to add another 15-20 MW in 2019 from its German project pipeline. The remaining 100 MW, which are supported by the strong German and French pipeline, should be added in 2020. Due to likely delays in project development, some of the portfolio projects could still be under construction by the end of 2020, but this is unlikely to affect the sale of the portfolio.

Overview of European onshore wind portfolio 2020 (as of H1/2020)

Windfarm	MW	Country	Status
Kührstedt-Alfstedt	43.2	Germany	in operation
Gerdau-Repowering	21.6	Germany	in operation
Schlenzer	6.5	Germany	under construction
	71.3		
Estimated additons in 2019			
Willerstedt or Kittlitz	13.8 / 20.7	Germany	under construction
Additonal small project	4-5	Germany	approval granted
Additions in 2020	**103 - 115**		

Source: PNE, Warburg Research

The reason why PNE sells projects via large portfolios is a higher selling price per MW. In 2016, the portfolio was sold at an average selling price of EUR 2.3m per MW, which was above the individual project transaction price of approx. EUR 2.0m per MW. We expect PNE to achieve a premium price again in 2020, based on:

(i) Investors are willing to accept a lower IRR for their investments for a diversified and already commissioned portfolio

(ii) A higher volume (and selling price) of a portfolio is attractive for a wider range of large investors, e.g. pension funds or asset managers. This increases competition and strengthens PNE's negotiation position.

(iii) Due to regulatory changes in Germany in 2017 a lot of projects couldn't be developed or are delayed. This still causes a project shortage on the German market, which drives up selling prices.

(iv) Political support for renewable energies is still on a high level and regulatory targets push utilities towards renewable energies. Considering (ii) and (iii), there should be a high interest from utilities and IPPs.

Compared to 2016, selling prices per MW have declined, mainly due to advances in wind turbine technology. We expect PNE to achieve a selling price of EUR 1.6–1.8m per MW, with a good chance of reaching the upper end of the given range. Thus, we expect the EV of the portfolio to be in a range of EUR 320-380m. Given an equity ratio of 30% the equity value should amount to EUR 96-114m, which should be reflected in the selling price.

In terms of profitability, we expect an average EBIT of EUR 0.35m per MW, based on PNE's reported accumulated earnings of EUR 24.6m in Q1/2019 (for 71.3 MW). In our view, this is a rather conservative approach, as a typical small to medium-sized turnkey project in Germany tends to generate an EBIT of EUR 0.25-0.35m per MW.

Calculation onshore portfolio sale 2020

Portfolio size in MW	200						
Price / MW mEUR	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Enterprise Value	280	300	320	340	360	380	400
Equity 30%	84	90	96	102	108	114	120

	EBIT/MW mEUR						
Portfolio size in MW	0.2	0.25	0.30	0.35	0.40	0.45	0.50
220	44	55	66	75.9	88	99	110
210	42	52.5	63	72.45	84	94.5	105
200	40	50	60	**69**	80	90	100
190	38	47.5	57	65.55	76	85.5	95
180	36	45	54	62.1	72	81	90
170	34	42.5	51	58.65	68	76.5	85

Source: Warburg Research

Our estimates for 2020 are based on the complete sale of the whole portfolio. When PNE sold its 142.5 MW portfolio in 2016, it retained a 20% stake, which was later sold in 2017. Thus, PNE might want to keep a stake in its 2020 portfolio as well. This would lead to a somewhat lower sales and EBIT generation from the upcoming divestment compared to our FY 2020 estimates. However, this would boost income from financial participations from 2021 onwards.

We expect PNE to remain the O&M manager of the portfolio, as it already provides O&M for the commissioned parks and might retain an equity stake in the portfolio. The development of the portfolio increases the O&M volume significantly and pushes the serviced volume towards the 2023 target of 2.200 MW.

As we expect PNE to sell its current portfolio at an attractive price the company might be tempted to stick with its current portfolio strategy and start the development of a new portfolio in 2023/24. Projects bundled in portfolios are likely to better meet the future demand of PNE's client base than individually sold projects (see chapter "Growth"). On top of that, this would enable the sale of combined projects (PV/wind/storage) as one costumer-ready solution. In terms of profitability, a continuation of its portfolio strategy should bolster PNE's average margin (from the announcement of a project to its divestment) and improve PNE's market position.

ROCE generation well ahead of cost of capital

Strong ROCE generation underlines value creation

The business model of a project developer makes it quite difficult for investors to assess value creation. As a consequence of its business model, PNE's EBIT generation tends to be very volatile, especially due to its portfolio strategy. In addition, the balance sheet reflects the number of projects under construction on the company's own book as well as projects in a late development stage that are currently in the divestment process. Hence, we prefer to take a multi-year approach to assess PNE's return generation.

Operating profitability

Over the last years, the main contributor to PNE's EBIT has changed from year to year. To give an overview of PNE's profitability, we divide timeline into different steps:

(i) 2010-2013: During this period, PNE's profitability was driven by a mix of offshore and onshore projects and the takeover of WKN in 2013.

(ii) 2014-2017: In this period, PNE developed its first portfolio (sale 2016/17) and received milestone payments from its offshore projects.

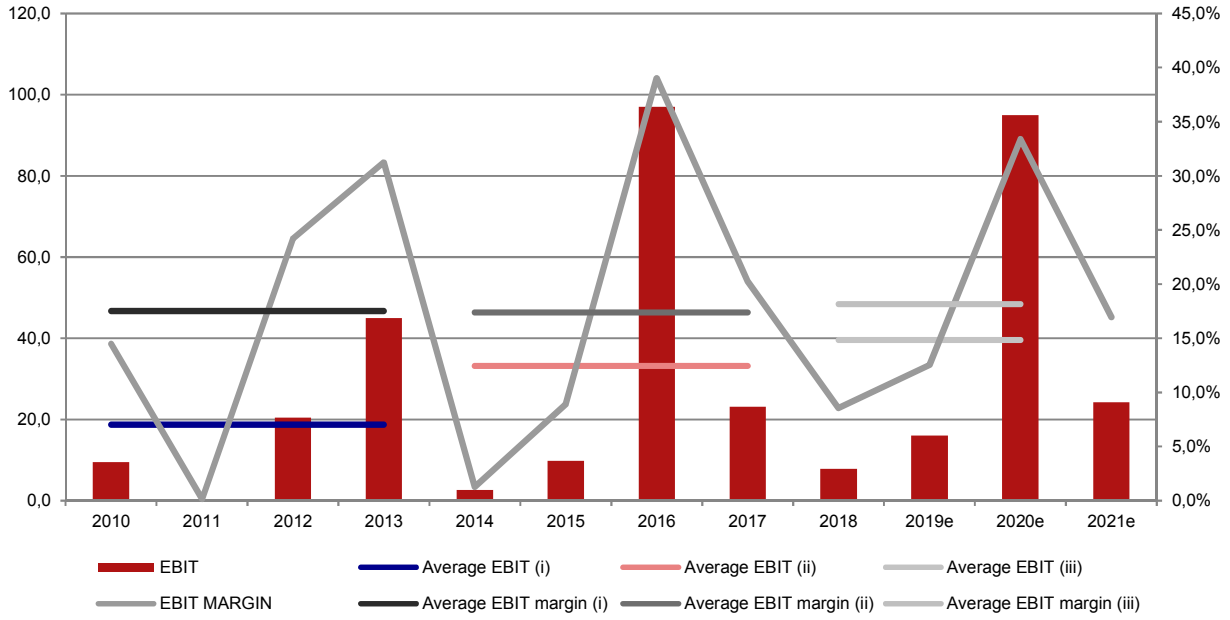
(iii) 2018-2020e: This period was/is under the influence of the second portfolio development (portfolio 2020) and primary onshore wind activities both in

Germany and abroad.

(iv) Beyond 2020e: After the successful portfolio sale, we expect PNE's operative business to be influenced by a higher share of services but to continue to be driven by its international onshore activities.

Each step can be seen as one project cycle in PNE's operative business.

Historical EBIT generation and projection



Source: Warburg Research

For the first period, PNE was able to generate an average EBIT margin of 17.5% and average EBIT of EUR 18.8m. In the second cycle, the EBIT margin remained at the same level (17.4%) but average EBIT rose to EUR 33.2m. The current cycle is characterised by an EBIT margin of 17.5% and improvement of average EBIT to EUR 37.6m. In our view, this development is proof of PNE's operational excellence and the continuous improvement in operating profitability and once again demonstrates the necessity to include a longer period of time to correctly evaluate PNE's business model.

The operating profitability is further underlined by PNE's long-term historical average EBIT margin (FY 2008-2018) of 17.3%.

We expect PNE's average EBIT margin to increase in the future, due to:

(i) An increasing proportion of services, which generate high EBIT margins.

(ii) PNE's international pipeline is set to deliver an increasing number of high-margin projects.

(iii) Possibility of another portfolio development after 2020.

(iv) PNE's repowering strategy is partly based on investments in wind farms with a remaining lifetime of two to five years. The power sales generated by these farms carry a high EBIT margin of around 30%.

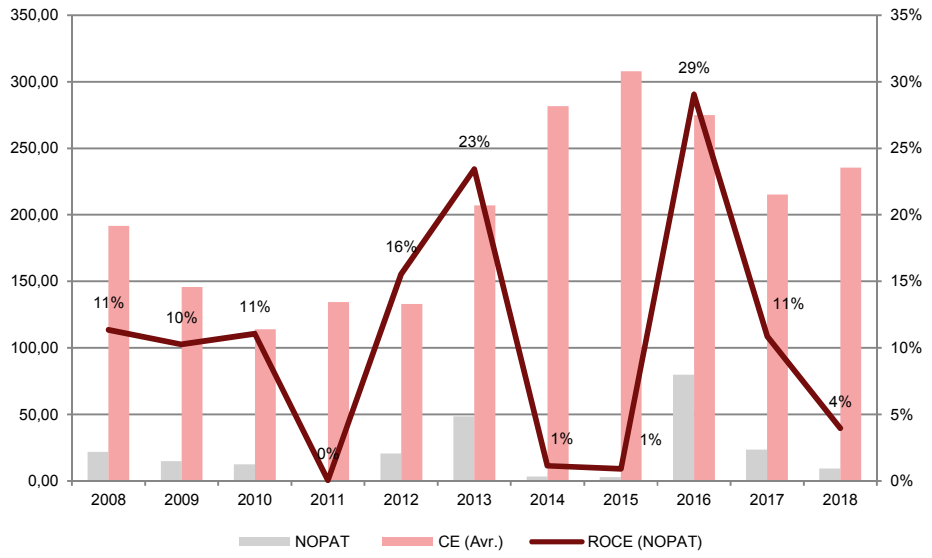
Long-term ROCE generation is well above cost of capital

Shareholders' funds put to effective use

Our analysis of ROCE generation (NOPAT approach) points to an annual average return generation of 10.7% over the last ten years (FY 2008-2018). This figure should be seen in the light of the current portfolio development, which results in a comparatively low ROCE generation for the years, in which the portfolio is being built (FY 2018-2019). For

these years, EBIT will be burdened by high construction costs, without related EBIT generation, and capital employed will be inflated due to the build-up of the asset base.

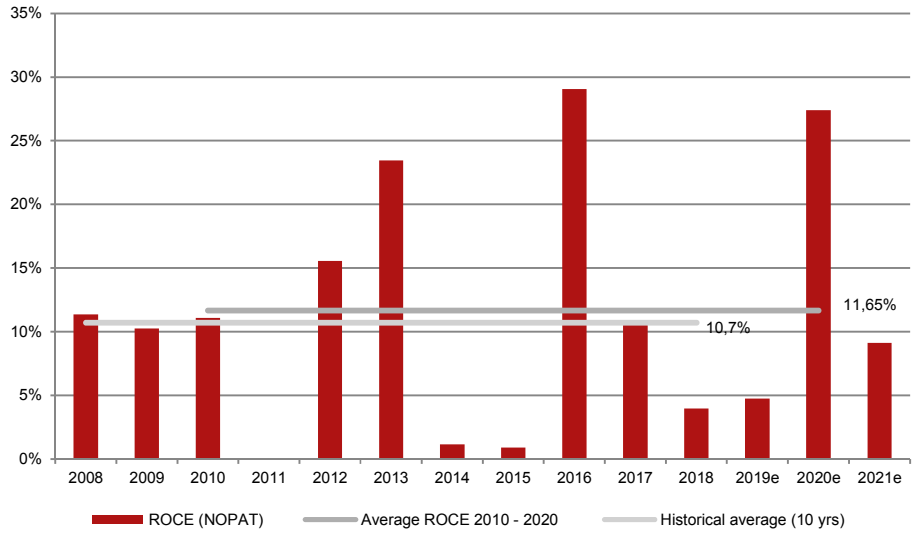
Historical ROCE generation



Source: Warburg Research

Taking into account our ROCE estimates for 2019 and 2020, where the portfolio sale will take place, the 10-year average return generation rises to 11.65%. In our view, this is a more straightforward approach, as it reflects PNE's operative development and includes the entire current project cycle.

Forecast ROCE generation



Source: Warburg Research

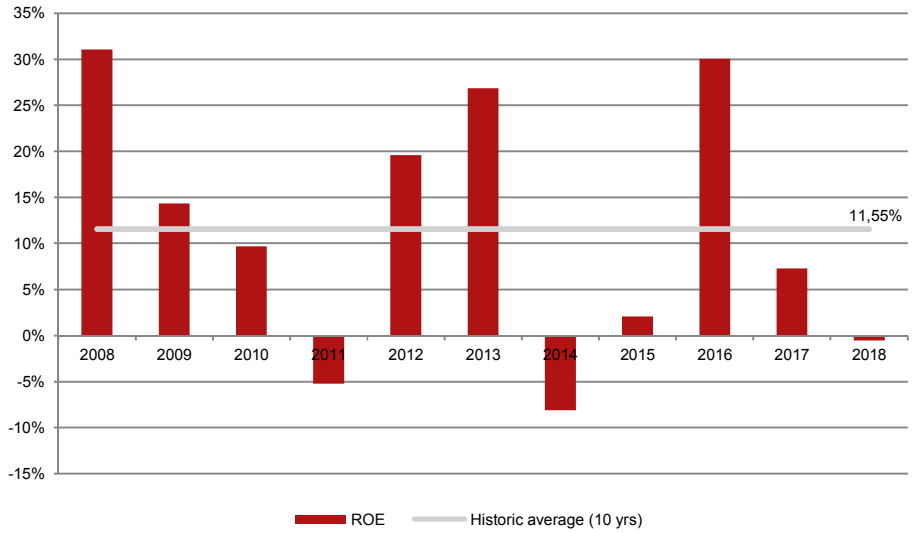
We calculate a WACC of 8.67% for PNE, reflecting a rather volatile business model and low visibility of its future operating development. Given a 10-year average ROCE of 10.7% and our ROCE estimates for the coming years, the company is clearly generating value in excess of its cost of capital.

Current discount to book value seems unjustified in light of ROE generation

Share price drops below book value

At the moment, PNE's share is trading below its book value (as of FY 2018), which we deem unjustified in the light of its attractive ROE generation. PNE was able to generate an attractive average ROE of 11.55% over the last ten years, underlining the sustainability of the business model and returns over the long term.

Historical ROE generation



Source: Warburg Research

Against this background, we consider a discount to the book value to be unjustified, as the long-term average of 11.55% indicates an appropriate return on shareholder's equity.

As already described in our ROCE section, the average ROE should be seen in the context of the current portfolio development. We expect PNE to deliver a very strong ROE of 23.08% in 2020 due to the portfolio sale. In 2021, ROE falls back to a low level of 4.34%, burdened by a very high level of equity carried in the balance sheet. We expect PNE to use this comfortable cash position to invest in its future project pipeline and implement its "scale up" strategy. We see strong growth perspectives for both (see chapter "Growth" and "Competitive Quality"), which in turn should result in substantially higher ROEs.

Another possibility could be the development of the next large portfolio, which requires high capex and thus a strong balance sheet. This option shifts returns to the period of the portfolio sale, but allows higher margins (see chapter "Portfolio sale ahead") and thus boosts the average ROE for the years after 2020 to a high level.

We do not consider any of the above options in our modelling, due to a very low visibility of investment amounts, timing or the announcement of another portfolio.

Valuation

- As an alternative valuation approach, we derived a probability-weighted value for the company's onshore pipeline of EUR 312m or EBIT/share of EUR 4.00.
- We deem the current share price discount to the book value per share to be unjustified, especially in light of future developments.
- The upcoming portfolio sale should boost the book value per share significantly above the current share price level.
- Our DCF-based price target is EUR 4.30

Valuation of onshore pipeline provides absolute floor value

Different valuation approaches point in the same direction

Valuation of the onshore project pipeline

As a result of PNE's lumpy earnings generation and the rather limited visibility due to the company's project development business, assigning an adequate fair value to PNE's shares via a DCF calculation is far from easy. As an alternative method of valuation, we have therefore attempted to derive an approximation of the value of PNE's onshore project pipeline. In order to do that, we have defined realisation opportunities for projects in each stage. That, in turn, provides us with a probability-weighted project pipeline. We then assume that each MW is worth EUR 0.2m on average in order to estimate the value of the project pipeline. This assumption is based on average EBIT/MW contributions achieved by various projects in different countries in the past. We regard our EBIT/MW estimate as rather conservative, since, for example, German projects usually achieve EBIT of EUR 0.25-0.35m per MW and Germany still accounts for most of PNE's sales.

Valuation of PNE's onshore pipeline

Country	Project phase			in MW
Q1/2019	**I-II**	**III**	**IV**	**Total**
Germany	1.402	208	27	1.637
Bulgaria	121	0	0	121
Romania	54	102	0	156
Turkey	629	71	0	700
UK	43	0	0	43
Hungary	0	42	0	42
USA	232	200	0	432
Canada	505	0	0	505
Italy	40	0	0	40
France	373	149	0	522
Poland	92	132	0	224
South Africa	230	30	0	260
Sweden	0	170	0	170
Panama	352	0	0	352
Total	**4.073**	**1.104**	**27**	**5.204**

Probability (WRe)	***20%***	***65%***	***100%***	
MW realised	815	718	27	
EBIT contribution	163	144	5	312
Value (EBIT) of pipeline		**312**	**mEUR (0.2 mEUR EBIT per MW)**	

Source: PNE, Warburg Research

Brief description of the individual stages:

(i) Stage I-II: Exploration & Development phase. As projects in this category are in the very early stages, the probability of realisation can be regarded as quite low. On the positive side, projects at this stage require low investment and thus the size of potential sunk costs can be considered as negligible. Nonetheless, our assumption of a mere 20% chance of realisation can be regarded as very conservative.

(ii) Stage III: Planning. Projects in stage three are clearly in an advanced stage. Some of the projects have already been approved and therefore have a significantly higher chance of being realised. The chances of realisation of projects in this stage can range from around 40% to more than 80% for projects with a building permit on hand. We estimate an average 65% chance of realisation for stage-three projects.

(iii) Stage IV: Construction till handover. Projects in the final stage are already under construction and in the process of being realised (100% probability).

Based on the assumptions above, our valuation method points to a value of EUR 312m for PNE's project pipeline. This approach, however, has several shortcomings and we therefore regard this as an absolute floor value for PNE:

(i) The included projects represent a mere snapshot of PNE's current pipeline and do not take into account any expansion of the pipeline in the coming years.

(ii) The already finished projects for PNE´s portfolio sale are not included in the reported pipeline. We estimate that these parks with a total output of 64.8 MW have an EBIT potential of at least EUR 24m.

(iii) Additionally, our approach does not reflect PNE's portfolio strategy, which is likely to generate an EBIT in excess of EUR 0.2m/MW. The last time PNE sold a portfolio (2016, buyer: Allianz Global Investors), it generated an EBIT of more than EUR 0.5m per MW.

Development of book value per share bears upside potential

Current discount to book value indicates upside potential

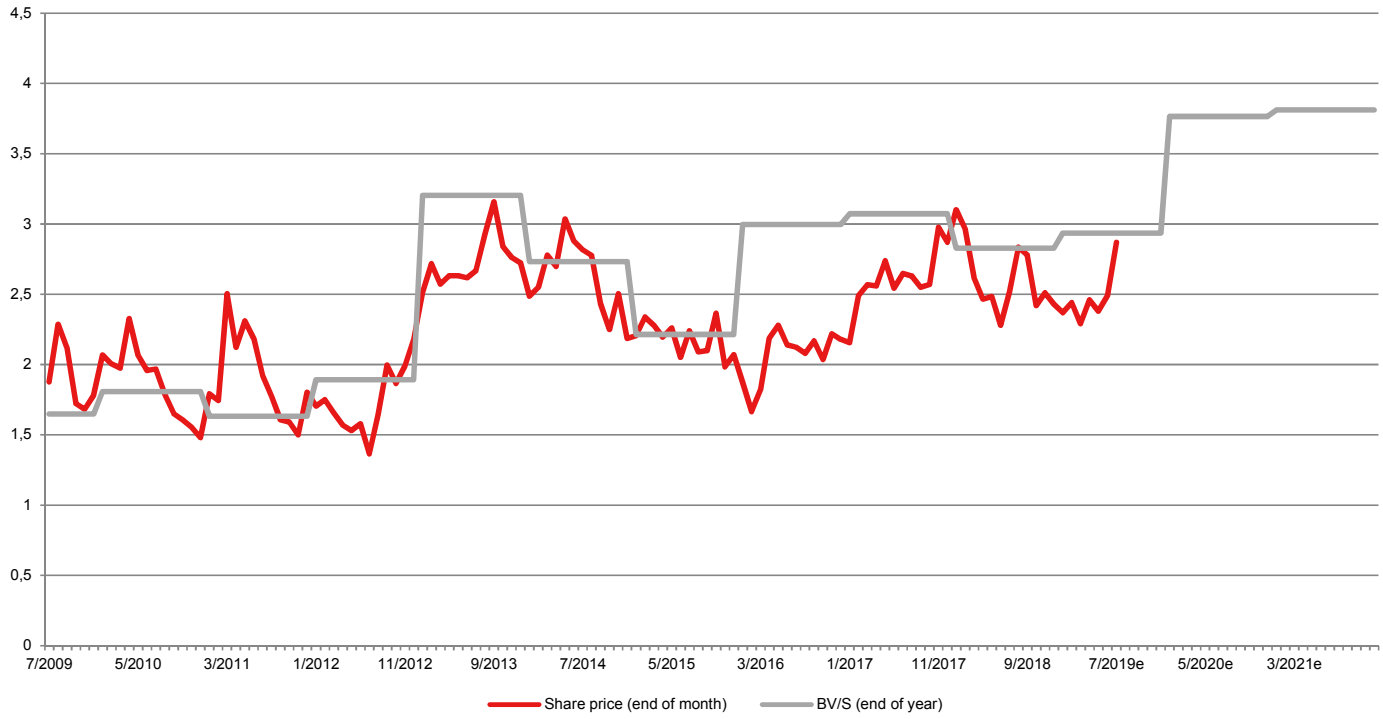
As already mentioned, we consider PNE's share price, which is trading below its book value per share, to be unjustified in view of the high ROCE and ROE generation. The discount increases significantly if our estimates for PNE's book value/share development in the coming years are taken into account.

Discount to book value

Source: Warburg Research

The shares are currently trading at a discount of roughly 3% to our estimated book value of EUR 2.86 by the end of FY 2019. With regard to 2020, the sale of the onshore portfolio does not seem to be reflected at all in the share price. We expect the BV/S to increase to EUR 3.77, which implies a discount of 25% to the current share price level.

Development of PNE's book value/share



Source: FactSet, Warburg Research

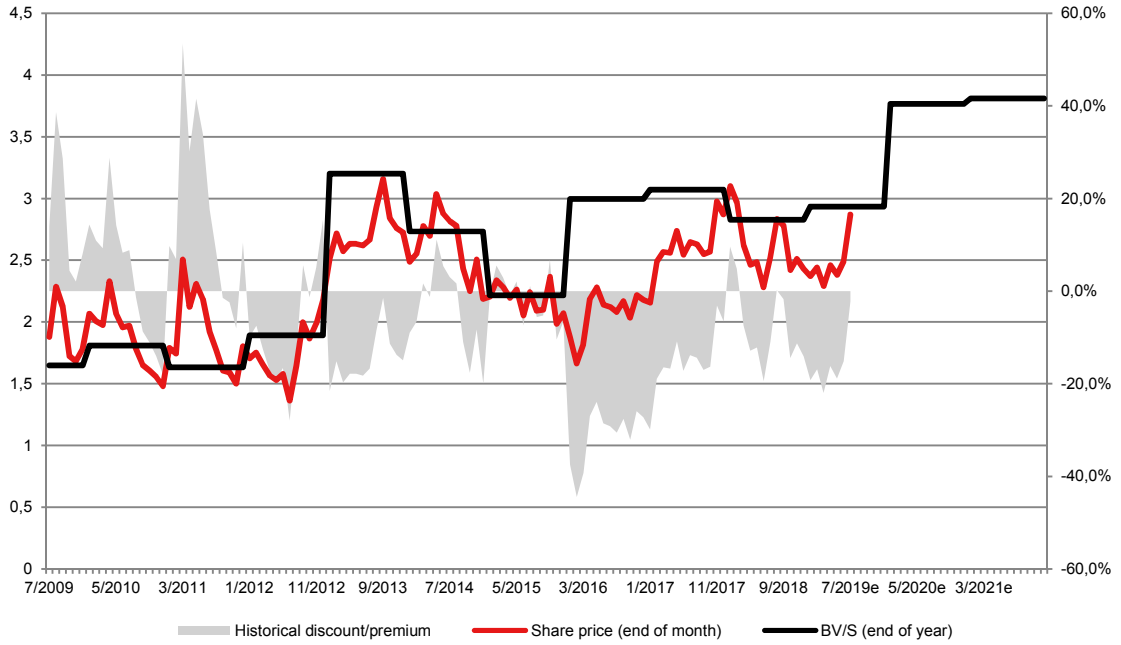
Historically, PNE's shares frequently traded below the estimated book value per share of the respective year. In our view, this was mainly caused by:

(i) A dispute between former management board and anchor shareholder, damaged investor confidence in the company and led to a significant drop in the share price. Subsequently, the entire supervisory board resigned and the CEO left the company.

(ii) The amendment of the German Renewable Energy Sources Act (EEG) in 2017 led to a less favourable outlook for the coming years and significantly lowered growth expectations for the entire industry.

(iii) In 2018, PNE had to write off some of its remaining offshore projects (EUR 10.8m) due to a regulatory change (new German Offshore Wind Energy Act). This may have triggered fears of further write-offs.

Development of premium/discount to BV/S



Source: Warburg Research

Historical discount to book value is no longer justified

For the periods after these events, a discount to the book value might have been appropriate, but we see no reason for this to continue, as

(i) As a consequence of the 2015 AGM, a new supervisory board and management were appointed and all conflicts resolved. The new management convinces with a positive track record in terms of the company's performance, strong ROCE/ROE generation and the achievement of its targets.

(ii) The renewable energy industry is relying less and less on regulations to promote sustainable energy generation due to the steadily declining costs of energy production (as can be seen in the LCOE) and an increasing use of PPAs to secure earnings streams.

(iii) PNE has a strong track record of successful projects, showing its ability to successfully deal with adverse conditions.

(iv) We deem the risk of further write-offs to be very low. The reason for the write-off was a new offshore development plan introduced by the German authorities, which omitted zone 4 of the German offshore area. As a consequence, PNE had to write off three zone 4 projects (Nemo, Nautilus, Jules Verne) to claim for compensation. The remaining offshore projects (Atlantis I+II) are located in zone 3, which is still part of the development plan. Thus, we see no reason for a further write-down. On the contrary, the current lawsuit (for zone 4 projects) could result in a compensation payment for PNE amounting to EUR 10.8m.

To sum it up, we see no reason why PNE's share price should currently trade below its book value per share. In view of our estimates for FY 2019 and 2020, we see significant upside from the upcoming increase in BV/S from the portfolio sale.

DCF calculation points to upside potential to current share price

DCF valuation

We prefer to use an absolute valuation method for PNE, due to the characteristics of its business model. Both the volatile earnings development and the earnings impact of PNE's portfolio strategy would lead to misleading conclusions when using EV/EBITDA or EV/EBIT multiples as the basis for valuation.

We therefore consider a DCF-based valuation approach to be more appropriate. Our DCF calculation points to a fair value of EUR 4.30, which we use as our price target. Our DCF calculation is based on the following assumptions:

(i) For the detailed planning period, we expect significant top-line growth due to several large project sales in 2019 and the sale of the 200 MW portfolio in 2020. For 2021, we expect PNE to further capitalise on its international project pipeline and first impacts from the acquired pipeline in Panama.

(ii) After 2021, we expect first impacts from PNE's extended service activities and PV projects in addition to ongoing growth on PNE's core markets. Our growth estimates are based on decreasing LCOE that make renewable energy even more attractive, the addition of huge repowering volumes to the market and constant strong political support for clean energy production. In view of the rather volatile character of PNE's revenue generation in the past, we expect top-line growth between 3% and 4%. For the terminal value (TV), we expect top-line growth of 1.5%, which reflects our expectation for long-term economic growth.

(iii) In terms of profitability, the detailed forecast period is influenced by the portfolio sale in 2020. While the 2019 EBIT margin of 12.7% is affected by costs associated with the portfolio development, we expect a significant higher margin of 31.2% in the year of the portfolio sale.

(iv) After the sale of the portfolio in 2020, we expect the EBIT margin to remain at a level of 17%. Our estimates are based on the sale of further highly profitable international projects and additional support from (i) an increasing share of service revenues (primarily O&M), which generate high EBIT margins of 17%-25% and (ii) an increase in the group-owned generation capacity for repowering and thus increasing power sales, which have EBIT margins of between 35-40%. It is important to stress that our margin estimates have to be seen as an average over the period. In case PNE builds another portfolio, the years of development are marked by significantly lower margins, while the year of sale exceeds our estimates.

(v) For the TV, we expect the EBIT margin to remain at the same level, supported by an increasing share of services, not only in O&M but also for construction, financial advisory and connected technologies (see chapters "Growth" and "Competitive Quality").

(vi) We calculate a WACC of 8.67%, employing a risk-free rate of 1.5% and a beta of 1.76, reflecting PNE's volatile business model.

(vii) A net debt of EUR 19.78m as reported in the FY 2018 statement

(viii) A pre-tax interest rate of 7%

(ix) A tax rate increasing to 25% from its current level (2019e: 18%), due to the use of tax loss carryforwards and different taxes in different countries, especially for renewable energy projects.

DCF model

	Detailed forecast period			Transitional period										Term. Value
Figures in EUR m	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	
Sales	128.4	284.3	143.5	149.2	155.2	161.4	167.8	174.5	179.8	185.2	190.7	196.4	202.3	
Sales change	*40.5 %*	*121.5 %*	*-49.5 %*	*4.0 %*	*4.0 %*	*4.0 %*	*4.0 %*	*4.0 %*	*3.0 %*	*3.0 %*	*3.0 %*	*3.0 %*	*3.0 %*	*1.5 %*
EBIT	16.3	88.7	24.3	25.4	26.4	27.4	28.5	29.7	30.6	31.5	32.4	33.4	34.4	
EBIT-margin	*12.7 %*	*31.2 %*	*16.9 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	*17.0 %*	
Tax rate (EBT)	*18.0 %*	*18.0 %*	*18.0 %*	*19.0 %*	*20.0 %*	*21.0 %*	*22.0 %*	*23.0 %*	*24.0 %*	*25.0 %*	*25.0 %*	*25.0 %*	*25.0 %*	
NOPAT	13.3	72.8	19.9	20.5	21.1	21.7	22.3	22.8	23.2	23.6	24.3	25.0	25.8	
Depreciation	12.7	14.5	7.9	12.0	12.2	12.5	12.7	13.0	13.2	13.5	13.8	14.1	14.0	
in % of Sales	*9.9 %*	*5.1 %*	*5.5 %*	*8.0 %*	*7.9 %*	*7.7 %*	*7.6 %*	*7.4 %*	*7.4 %*	*7.3 %*	*7.2 %*	*7.2 %*	*6.9 %*	
Changes in provisions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Change in Liquidity from														
- Working Capital	15.0	-25.5	-7.0	-1.0	3.9	1.3	1.3	1.4	0.3	0.4	0.4	0.4	0.4	
- Capex	58.0	10.2	10.7	11.2	11.6	12.1	12.6	13.1	13.5	13.9	14.3	14.7	15.2	
Capex in % of Sales	*45.2 %*	*3.6 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	*7.5 %*	
Other	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Free Cash Flow (WACC Model)	-52.8	102.5	24.1	22.4	17.8	20.7	21.1	21.4	22.6	22.9	23.4	24.0	24.3	33
PV of FCF	-51.3	91.7	19.9	17.0	12.4	13.3	12.4	11.6	11.3	10.5	9.9	9.4	8.7	164
share of PVs	17.65 %			34.17 %										48.18 %

Model parameter

Derivation of WACC:		Derivation of Beta:	
Debt ratio	40.00 %	Financial Strength	1.50
Cost of debt (after tax)	4.9 %	Liquidity (share)	1.50
Market return	7.00 %	Cyclicality	2.00
Risk free rate	1.50 %	Transparency	1.80
		Others	2.00
WACC	**8.67 %**	**Beta**	**1.76**

Valuation (m)

Present values 2031e	177		
Terminal Value	164		
Financial liabilities	163		
Pension liabilities	0		
Hybrid capital	0		
Minority interest	-14		
Market val. of investments	0		
Liquidity	129	No. of shares (m)	74.4
Equity Value	**322**	**Value per share (EUR)**	**4.32**

Sensitivity Value per Share (EUR)

		Terminal Growth						
Beta	WACC	0.75 %	1.00 %	1.25 %	**1.50 %**	1.75 %	2.00 %	2.25 %
2.06	9.7 %	3.58	3.63	3.67	3.73	3.78	3.84	3.90
1.91	9.2 %	3.83	3.88	3.94	4.00	4.07	4.14	4.22
1.84	8.9 %	3.97	4.03	4.09	4.16	4.23	4.31	4.39
1.76	8.7 %	4.11	4.18	4.25	**4.32**	4.40	4.49	4.58
1.68	8.4 %	4.27	4.34	4.42	4.50	4.59	4.68	4.79
1.61	8.2 %	4.44	4.52	4.60	4.69	4.79	4.89	5.01
1.46	7.7 %	4.81	4.90	5.01	5.12	5.24	5.37	5.52

		Delta EBIT-margin						
Beta	WACC	-1.5 pp	-1.0 pp	-0.5 pp	**+0.0 pp**	+0.5 pp	+1.0 pp	+1.5 pp
2.06	9.7 %	3.39	3.50	3.61	3.73	3.84	3.95	4.06
1.91	9.2 %	3.65	3.76	3.88	4.00	4.12	4.24	4.36
1.84	8.9 %	3.79	3.91	4.03	4.16	4.28	4.40	4.53
1.76	8.7 %	3.94	4.07	4.20	**4.32**	4.45	4.58	4.70
1.68	8.4 %	4.11	4.24	4.37	4.50	4.63	4.76	4.89
1.61	8.2 %	4.28	4.42	4.55	4.69	4.83	4.96	5.10
1.46	7.7 %	4.68	4.83	4.97	5.12	5.27	5.41	5.56

Valuation

	2015	2016	2017	2018	2019e	2020e	2021e
Price / Book	1.0 x	0.7 x	0.8 x	0.9 x	0.9 x	0.7 x	0.7 x
Book value per share ex intangibles	1.38	2.19	2.30	2.16	2.25	3.08	3.12
EV / Sales	3.1 x	0.6 x	1.6 x	2.6 x	2.4 x	0.6 x	1.1 x
EV / EBITDA	17.3 x	1.2 x	6.5 x	14.2 x	10.7 x	1.5 x	4.7 x
EV / EBIT	34.9 x	1.4 x	8.0 x	30.0 x	19.1 x	1.8 x	6.2 x
EV / EBIT adj.*	34.9 x	1.4 x	8.0 x	30.0 x	19.1 x	1.8 x	6.2 x
P / FCF	n.a.	1.4 x	n.a.	n.a.	n.a.	2.3 x	13.2 x
P / E	44.5 x	2.3 x	11.8 x	n.a.	41.9 x	3.4 x	17.2 x
P / E adj.*	44.5 x	2.3 x	11.8 x	n.a.	41.9 x	3.4 x	17.2 x
Dividend Yield	2.2 %	5.9 %	1.5 %	1.5 %	1.4 %	4.1 %	1.4 %
FCF Potential Yield (on market EV)	4.5 %	64.0 %	11.3 %	3.5 %	6.4 %	51.0 %	14.2 %

*Adjustments made for: -

Company Specific Items

	2015	2016	2017	2018	2019e	2020e	2021e
Pipeline onshore (MW)	4,916	4,819	4,845	4,833	n.a.	n.a.	n.a.
Pipeline offshore (own projects)	2,640	2,640	2,852	800	n.a.	n.a.	n.a.

Consolidated profit & loss

In EUR m	2015	2016	2017	2018	2019e	2020e	2021e
Sales	**109.5**	**248.6**	**114.1**	**91.4**	**128.4**	**284.3**	**143.5**
Change Sales yoy	-48.2 %	127.0 %	-54.1 %	-19.9 %	40.5 %	121.5 %	-49.5 %
Increase / decrease in inventory	116.1	1.6	63.3	15.1	13.5	0.0	0.0
Own work capitalised	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Sales	**225.6**	**250.2**	**177.4**	**106.4**	**141.9**	**284.3**	**143.5**
Material expenses	154.9	97.0	108.4	36.7	68.2	118.5	66.6
Gross profit	**70.7**	**153.2**	**69.0**	**69.7**	**73.6**	**165.9**	**76.8**
Gross profit margin	*64.5 %*	*61.6 %*	*60.5 %*	*76.3 %*	*57.3 %*	*58.3 %*	*53.6 %*
Personnel expenses	29.3	25.4	25.8	27.8	28.5	29.0	29.5
Other operating income	7.7	9.1	9.5	5.3	7.2	9.0	6.4
Other operating expenses	29.5	26.9	24.1	30.8	23.4	42.6	21.5
Unfrequent items	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EBITDA	**19.7**	**110.0**	**28.6**	**16.5**	**28.9**	**103.2**	**32.2**
Margin	*18.0 %*	*44.2 %*	*25.1 %*	*18.1 %*	*22.5 %*	*36.3 %*	*22.5 %*
Depreciation of fixed assets	9.9	12.9	5.5	8.7	12.7	14.5	7.9
EBITA	**9.8**	**97.1**	**23.2**	**7.8**	**16.3**	**88.7**	**24.3**
Amortisation of intangible assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goodwill amortisation	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EBIT	**9.8**	**97.0**	**23.1**	**7.8**	**16.3**	**88.7**	**24.3**
Margin	*8.9 %*	*39.0 %*	*20.3 %*	*8.6 %*	*12.7 %*	*31.2 %*	*16.9 %*
EBIT adj.	**9.8**	**97.0**	**23.1**	**7.8**	**16.3**	**88.7**	**24.3**
Interest income	1.7	1.1	0.6	0.8	0.9	1.7	0.6
Interest expenses	16.4	17.3	10.7	10.6	11.0	11.7	10.0
Other financial income (loss)	0.3	0.7	1.0	0.1	0.1	0.1	0.1
EBT	**-5.0**	**81.6**	**14.1**	**-2.1**	**6.3**	**78.8**	**15.0**
Margin	*-4.5 %*	*32.8 %*	*12.3 %*	*-2.3 %*	*4.9 %*	*27.7 %*	*10.5 %*
Total taxes	-3.6	14.5	-0.2	0.4	1.1	14.2	2.7
Net income from continuing operations	**-1.4**	**67.1**	**14.2**	**-2.5**	**5.1**	**64.6**	**12.3**
Income from discontinued operations (net of tax)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net income before minorities	**-1.4**	**67.1**	**14.2**	**-2.5**	**5.1**	**64.6**	**12.3**
Minority interest	-4.9	-1.9	-2.8	-1.4	0.0	0.0	0.0
Net income	**3.5**	**69.0**	**17.1**	**-1.1**	**5.1**	**64.6**	**12.3**
Margin	*3.2 %*	*27.7 %*	*15.0 %*	*-1.2 %*	*4.0 %*	*22.7 %*	*8.6 %*
Number of shares, average	74.9	76.6	76.6	76.5	74.4	74.4	74.4
EPS	**0.05**	**0.90**	**0.22**	**-0.01**	**0.07**	**0.87**	**0.17**
EPS adj.	0.05	0.91	0.22	-0.01	0.07	0.87	0.17

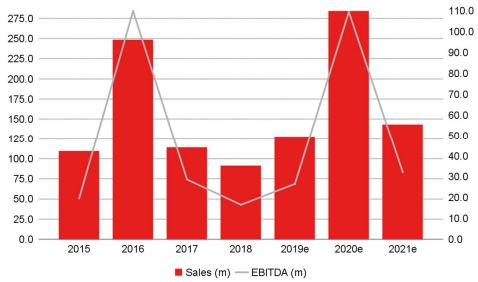
*Adjustments made for:

Guidance: PNE: EBIT of EUR 15-20m; EBITDA EUR 25-30m

Financial Ratios

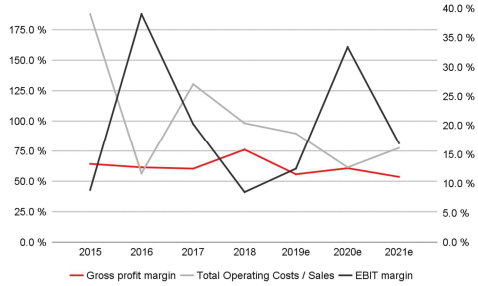
	2015	2016	2017	2018	2019e	2020e	2021e
Total Operating Costs / Sales	188.0 %	56.4 %	130.4 %	98.4 %	88.0 %	63.7 %	77.5 %
Operating Leverage	-5.5 x	7.0 x	1.4 x	3.3 x	2.7 x	3.7 x	1.5 x
EBITDA / Interest expenses	1.2 x	6.3 x	2.7 x	1.6 x	2.6 x	8.8 x	3.2 x
Tax rate (EBT)	71.9 %	17.7 %	-1.2 %	-19.4 %	18.0 %	18.0 %	18.0 %
Dividend Payout Ratio	n.m.	13.7 %	21.5 %	n.m.	58.1 %	13.8 %	24.2 %
Sales per Employee	497,836	1,057,774	309,149	234,305	329,123	729,023	367,827

Sales, EBITDA
in EUR m



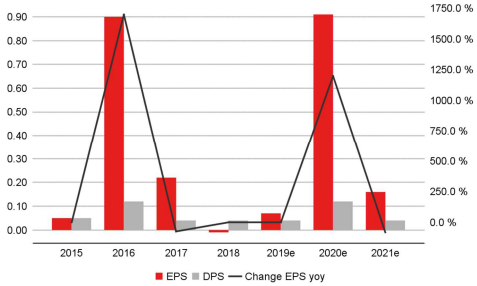
Source: Warburg Research

Operating Performance
in %



Source: Warburg Research

Performance per Share



Source: Warburg Research

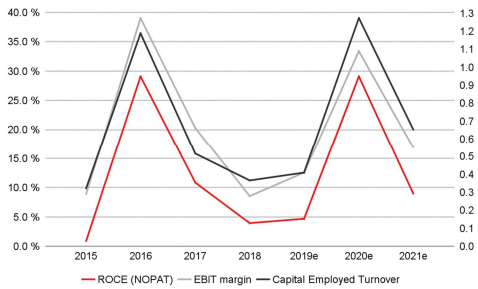
Consolidated balance sheet

In EUR m	2015	2016	2017	2018	2019e	2020e	2021e
Assets							
Goodwill and other intangible assets	63.1	67.4	66.8	65.1	65.1	65.1	65.1
thereof other intangible assets	4.0	4.0	3.4	1.7	1.7	1.7	1.7
thereof Goodwill	60.4	63.4	63.4	63.4	63.4	63.4	63.4
Property, plant and equipment	167.3	39.2	103.9	96.1	141.4	77.6	80.4
Financial assets	3.2	28.5	2.5	2.0	2.0	2.0	2.0
Other long-term assets	17.4	7.1	11.7	16.5	16.5	16.5	16.5
Fixed assets	**251.1**	**142.2**	**184.9**	**179.7**	**225.0**	**161.2**	**164.0**
Inventories	121.2	112.9	86.4	117.3	132.5	110.0	100.0
Accounts receivable	15.6	22.1	10.3	13.1	14.0	16.0	14.0
Liquid assets	86.1	147.7	194.0	129.1	108.4	179.1	201.6
Other short-term assets	14.3	7.0	17.8	13.4	13.4	13.4	13.4
Current assets	**237.2**	**289.8**	**308.4**	**272.9**	**268.3**	**318.5**	**329.0**
Total Assets	**488.3**	**432.0**	**493.3**	**452.6**	**493.3**	**479.7**	**493.0**
Liabilities and shareholders' equity							
Subscribed capital	76.6	76.6	76.6	76.6	76.6	76.6	76.6
Capital reserve	82.3	82.3	82.3	82.3	82.3	82.3	82.3
Retained earnings	11.0	76.9	85.0	77.6	79.7	141.4	144.7
Other equity components	-0.8	-1.0	-0.9	-6.2	-6.3	-6.2	-6.3
Shareholders' equity	169.0	234.8	242.9	230.2	232.3	294.1	297.4
Minority interest	-3.1	-5.4	-7.7	-13.9	-13.9	-13.9	-13.9
Total equity	**165.9**	**229.4**	**235.2**	**216.3**	**218.4**	**280.1**	**283.4**
Provisions	15.7	11.9	5.9	10.0	10.0	10.0	10.0
thereof provisions for pensions and similar obligations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financial liabilities (total)	260.3	127.6	179.9	162.8	200.3	120.0	135.0
thereof short-term financial liabilities	35.9	2.2	6.4	18.3	24.3	10.0	10.0
Accounts payable	16.9	15.7	25.3	14.9	16.0	21.0	16.0
Other liabilities	29.5	47.4	47.0	48.6	48.6	48.6	48.6
Liabilities	**322.3**	**202.6**	**258.1**	**236.3**	**274.9**	**199.6**	**209.6**
Total liabilities and shareholders' equity	**488.3**	**432.0**	**493.3**	**452.6**	**493.3**	**479.7**	**493.0**

Financial Ratios

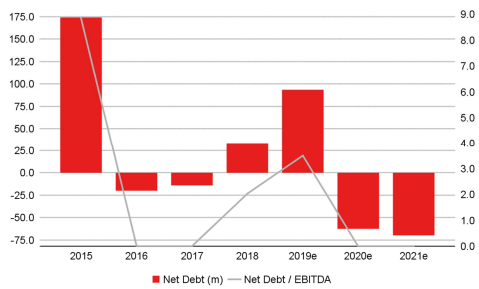
	2015	2016	2017	2018	2019e	2020e	2021e
Efficiency of Capital Employment							
Operating Assets Turnover	0.4 x	1.6 x	0.7 x	0.4 x	0.5 x	1.6 x	0.8 x
Capital Employed Turnover	0.3 x	1.2 x	0.5 x	0.4 x	0.4 x	1.3 x	0.7 x
ROA	1.4 %	48.5 %	9.2 %	-0.6 %	2.3 %	40.1 %	7.5 %
Return on Capital							
ROCE (NOPAT)	0.9 %	29.1 %	10.9 %	4.0 %	4.8 %	27.4 %	9.1 %
ROE	2.1 %	34.2 %	7.1 %	-0.5 %	2.2 %	24.6 %	4.2 %
Adj. ROE	2.1 %	34.7 %	7.1 %	-0.5 %	2.2 %	24.6 %	4.2 %
Balance sheet quality							
Net Debt	174.2	-20.1	-14.1	33.7	91.9	-59.1	-66.7
Net Financial Debt	174.2	-20.1	-14.1	33.7	91.9	-59.1	-66.7
Net Gearing	105.0 %	-8.7 %	-6.0 %	15.6 %	42.1 %	-21.1 %	-23.5 %
Net Fin. Debt / EBITDA	886.0 %	n.a.	n.a.	204.3 %	317.8 %	n.a.	n.a.
Book Value / Share	2.2	3.1	3.2	3.0	3.1	4.0	4.0
Book value per share ex intangibles	1.4	2.2	2.3	2.2	2.2	3.1	3.1

ROCE Development



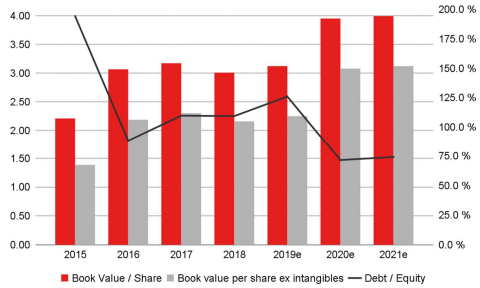
Source: Warburg Research

Net debt
in EUR m



Source: Warburg Research

Book Value per Share
in EUR



Source: Warburg Research

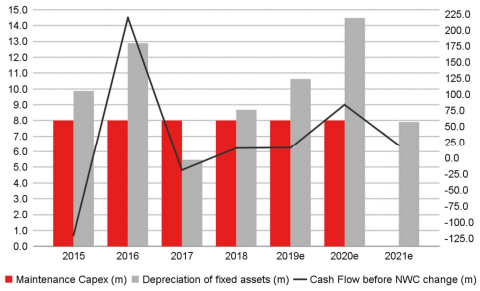
Consolidated cash flow statement

In EUR m	2015	2016	2017	2018	2019e	2020e	2021e
Net income	-1.4	67.1	14.2	-2.5	5.1	64.6	12.3
Depreciation of fixed assets	9.9	12.9	5.5	8.7	12.7	14.5	7.9
Amortisation of goodwill	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amortisation of intangible assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase/decrease in long-term provisions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other non-cash income and expenses	-128.9	139.7	-38.3	9.7	0.0	0.0	0.0
Cash Flow before NWC change	**-120.3**	**219.7**	**-18.5**	**15.9**	**17.8**	**79.1**	**20.2**
Increase / decrease in inventory	31.2	8.2	26.6	-31.0	-15.1	22.5	10.0
Increase / decrease in accounts receivable	13.5	-6.5	11.9	-2.8	-0.9	-2.0	2.0
Increase / decrease in accounts payable	-4.6	-1.2	9.6	-10.4	1.1	5.0	-5.0
Increase / decrease in other working capital positions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase / decrease in working capital (total)	40.1	0.6	48.0	-44.1	-15.0	25.5	7.0
Net cash provided by operating activities [1]	**-80.2**	**220.3**	**29.5**	**-28.2**	**2.8**	**104.6**	**27.2**
Investments in intangible assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Investments in property, plant and equipment	-2.9	-108.7	-70.0	-4.6	-58.0	-10.2	-10.7
Payments for acquisitions	0.0	103.3	0.0	0.0	0.0	59.6	0.0
Financial investments	0.0	-0.4	-32.7	0.0	0.0	0.0	0.0
Income from asset disposals	23.2	2.7	11.0	0.8	0.0	0.0	0.0
Net cash provided by investing activities [2]	**20.3**	**-2.2**	**-26.3**	**-3.8**	**-58.0**	**49.4**	**-10.7**
Change in financial liabilities	73.1	-132.7	52.2	-13.9	37.5	-80.3	15.0
Dividends paid	-3.0	-3.1	-9.2	-3.1	-3.0	-3.0	-8.9
Purchase of own shares	0.0	0.0	0.0	-14.0	0.0	0.0	0.0
Capital measures	9.5	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	-1.7	0.0	0.0	0.0
Net cash provided by financing activities [3]	**79.6**	**-135.8**	**43.0**	**-32.6**	**34.5**	**-83.3**	**6.1**
Change in liquid funds [1]+[2]+[3]	**19.6**	**82.3**	**46.3**	**-64.6**	**-20.6**	**70.6**	**22.6**
Effects of exchange-rate changes on cash	-5.6	-20.7	0.0	0.0	0.0	0.0	0.0
Cash and cash equivalent at end of period	**86.1**	**147.7**	**194.0**	**129.4**	**108.4**	**179.1**	**201.6**

Financial Ratios

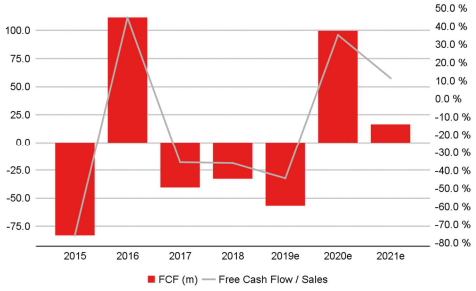
	2015	2016	2017	2018	2019e	2020e	2021e
Cash Flow							
FCF	-83.2	111.6	-40.5	-32.8	-55.2	94.4	16.5
Free Cash Flow / Sales	-75.9 %	44.9 %	-35.5 %	-35.9 %	-43.0 %	33.2 %	11.5 %
Free Cash Flow Potential	15.2	87.5	20.8	8.1	19.8	81.0	21.5
Free Cash Flow / Net Profit	-2396.3 %	161.7 %	-237.2 %	2929.8 %	-1076.5 %	146.0 %	134.0 %
Interest Received / Avg. Cash	2.2 %	1.0 %	0.4 %	0.5 %	0.8 %	1.2 %	0.3 %
Interest Paid / Avg. Debt	7.3 %	8.9 %	7.0 %	6.2 %	6.1 %	7.3 %	7.8 %
Management of Funds							
Investment ratio	2.7 %	43.7 %	61.4 %	5.0 %	45.2 %	3.6 %	7.5 %
Maint. Capex / Sales	7.3 %	3.2 %	7.0 %	8.8 %	6.2 %	2.8 %	5.6 %
Capex / Dep	29.3 %	841.8 %	1274.4 %	52.6 %	458.0 %	70.4 %	135.7 %
Avg. Working Capital / Sales	127.8 %	48.1 %	83.6 %	102.2 %	95.8 %	41.4 %	70.8 %
Trade Debtors / Trade Creditors	92.7 %	141.0 %	40.6 %	87.4 %	87.5 %	76.2 %	87.5 %
Inventory Turnover	1.3 x	0.9 x	1.3 x	0.3 x	0.5 x	1.1 x	0.7 x
Receivables collection period (days)	52	32	33	52	40	21	36
Payables payment period (days)	40	59	85	149	86	65	88
Cash conversion cycle (Days)	298	399	239	1,071	663	295	496

CAPEX and Cash Flow
in EUR m



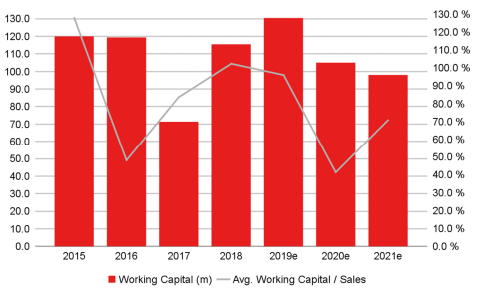
Source: Warburg Research

Free Cash Flow Generation



Source: Warburg Research

Working Capital



Source: Warburg Research

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This report has been made accessible to the company analysed.

Company	Disclosure	Link to the historical price targets and rating changes (last 12 months)
PNE AG	5, 7	http://www.mmwarburg.com/disclaimer/disclaimer_en/DE000A0JBPG2.htm

INVESTMENT RECOMMENDATION

Investment recommendation: expected direction of the share price development of the financial instrument up to the given price target in the opinion of the analyst who covers this financial instrument.

-B-	**Buy:**	The price of the analysed financial instrument is expected to rise over the next 12 months.
-H-	**Hold:**	The price of the analysed financial instrument is expected to remain mostly flat over the next 12 months.
-S-	**Sell:**	The price of the analysed financial instrument is expected to fall over the next 12 months.
"-"	**Rating suspended:**	The available information currently does not permit an evaluation of the company.

WARBURG RESEARCH GMBH – ANALYSED RESEARCH UNIVERSE BY RATING

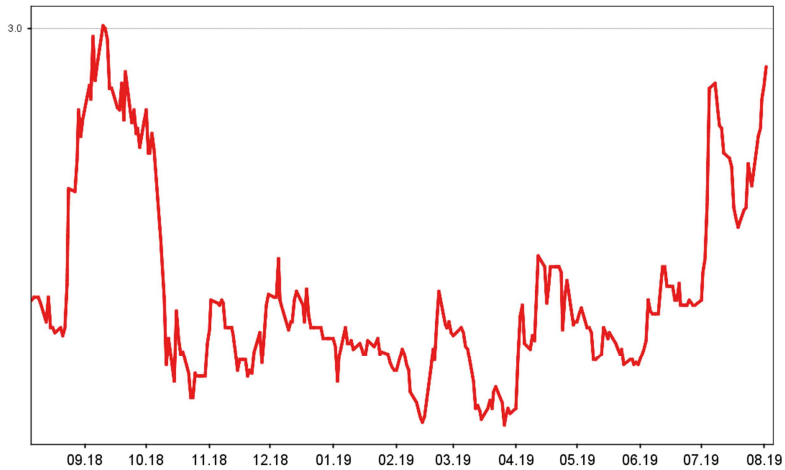
Rating	Number of stocks	% of Universe
Buy	122	61
Hold	67	34
Sell	6	3
Rating suspended	5	3
Total	**200**	**100**

WARBURG RESEARCH GMBH – ANALYSED RESEARCH UNIVERSE BY RATING …

… taking into account only those companies which were provided with major investment services in the last twelve months.

Rating	Number of stocks	% of Universe
Buy	33	80
Hold	6	15
Sell	0	0
Rating suspended	2	5
Total	**41**	**100**

PRICE AND RATING HISTORY PNE AG AS OF 05.08.2019



Markings in the chart show rating changes by Warburg Research GmbH in the last 12 months. Every marking details the date and closing price on the day of the rating change.

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