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10 January 2024

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RATINGS

EnBW Energie Baden-Wuerttemberg AG

Domicile	Karlsruhe, Germany
Long Term Rating	Baa1
Type	LT Issuer Rating
Outlook	Stable

Please see the ratings section at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

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EnBW Energie Baden-Wuerttemberg AG

Update to credit analysis

Summary

The credit quality of EnBW Energie Baden-Wuerttemberg AG's (EnBW), Germany's only fully vertically integrated utility, is supported by its scale and its leading position in its home state of Baden-Wuerttemberg; the solid share of regulated and predictable earnings from its distribution and transmission grid operations; the increasing profit contribution from its largely contracted renewables generation, underpinned by capacity growth; and its balanced financial policy and demonstrated commitment to maintaining robust credit quality.

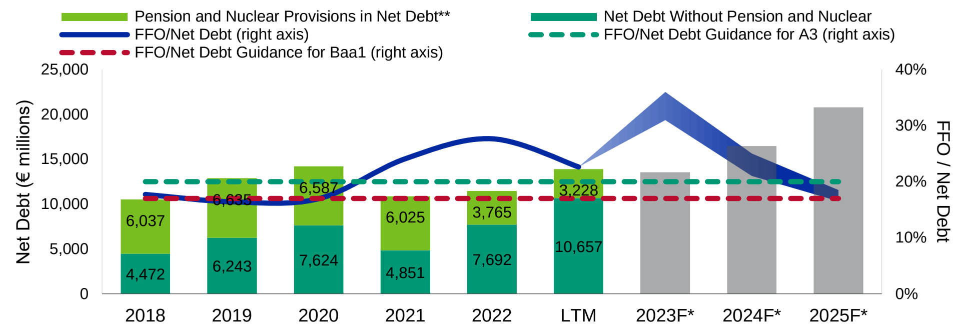
The company remains exposed to volatile energy prices and Germany's evolving decarbonisation policies through its still-substantial domestic conventional generation capacity, and faces intense competition in the retail markets for energy and related services. In addition, EnBW's sizable investment programme of €14 billion over 2023-25, which is focused on grid infrastructure and renewable installations, carries some execution risks and will likely lead to temporary pressure on credit metrics before projects start returning cash.

Because of the 46.75% ownership by the Land of Baden-Wuerttemberg (Aaa stable), we consider EnBW a government-related issuer (GRI). Based on our expectation of a moderate support probability by the state government in case of financial distress, the Baa1 rating factors in a one-notch uplift from EnBW's standalone credit quality, or Baseline Credit Assessment (BCA), of baa2.

Exhibit 1

Current boost to credit metrics from high power prices likely to subside through 2025 as high investments will be financed with additional debt

Net debt and funds from operations (FFO)/net debt



All figures and ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations. Periods are financial year-end unless indicated. LTM = Last 12 months as of 30 September 2023. *Moody's forecasts (F) are Moody's opinion and do not represent the views of the issuer. **Pension and nuclear provisions are shown net of dedicated financial assets.
Source: Moody's Financial Metrics™ and Moody's Investors Service forecasts

Credit strengths

» High share of earnings from regulated transmission and distribution grids under a reliable regulatory framework

» Growing share of renewable assets, mostly backed by subsidies or power purchase agreements (PPAs)

» Track record of measures to defend credit quality and commitment to maintain solid investment-grade rating

» Supportive shareholders, reflected by moderate dividend extractions

Credit challenges

» Large capital spending programme, which will constrain credit metrics and entails some execution risks

» Dynamic evolution of decarbonisation policies, which increases strain on conventional generation

» Growing share of renewable assets increases resource risk and thus higher earnings volatility

Rating outlook

The stable rating outlook reflects our expectation that EnBW will record solid earnings growth over 2023-24, which will allow the company to continue to fund a substantial share of capital spending from generated cash flow. Moreover, the stable outlook factors in our expectation that the company will maintain a prudent financial policy and put in place mitigants should its funds from operations (FFO)/net debt fall below 17% or retained cash flow (RCF)/net debt fall below its 12% target.

Factors that could lead to an upgrade

Upward rating pressure could develop over time if EnBW's FFO/net debt increases above 20% on a sustained basis. At the same time, a rating upgrade would require RCF/net debt to improve to the mid-teens in percentage terms.

Factors that could lead to a downgrade

We could downgrade EnBW's rating if its credit metrics are likely to remain persistently below the above-mentioned guidance, with FFO/net debt below 17% and RCF/net debt below 12%. A reduction in the government support assumption incorporated into EnBW's rating is also likely to lead to a downward rating adjustment.

Key indicators

Exhibit 2
EnBW Energie Baden-Wuerttemberg AG

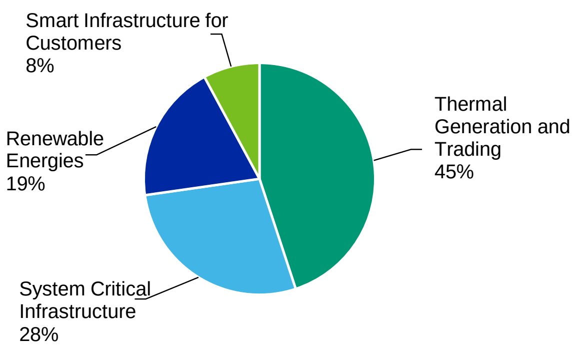
	2019	2020	2021	2022	LTM	12-18 month forward view*
(CFO Pre-W/C + Interest) / Interest Expense	4.6x	5.7x	6.4x	5.0x	5.0x	6x - 6.7x
(CFO Pre-W/C) / Net Debt	16.4%	17.0%	24.1%	27.7%	22.6%	18% - 25%
RCF / Net Debt	13.7%	13.9%	20.5%	24.0%	19.5%	15% - 22%

All figures and ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Periods are financial year-end unless indicated.
LTM = Last 12 months as of 30 September 2023.
*Moody's forward view is Moody's opinion and does not represent the views of the issuer.
Sources: Moody's Financial Metrics™ and Moody's Investors Service forecasts

Profile

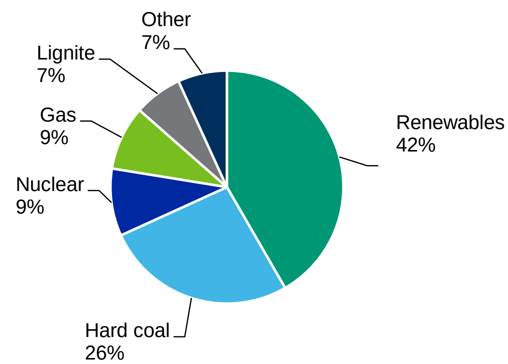
EnBW Energie Baden-Wuerttemberg AG is one of the leading utilities in Germany, with a dominant position in the south-western state of Baden-Wuerttemberg, one of Europe's wealthiest regions. Its vertically integrated energy activities serve around 5.5 million customers and comprise electricity generation and trading; transmission and distribution networks; renewables; and the supply of electricity, gas and related services.

Exhibit 3
Regulated grids account for a substantial share of EnBW's earnings
Adjusted EBITDA breakdown (LTM) as reported by EnBW



LTM = Last 12 months as of 30 September 2023.
Total adjusted LTM EBITDA is €5.4 billion. Renewable Energies, Thermal Generation and Trading together constitute the "Sustainable Generation Infrastructure" segment.
Sources: Company and Moody's Investors Service

Exhibit 4
EnBW's generation capacity is dominated by renewables
Installed capacity (2022)



Total capacity: 13.1 gigawatt (GW); nuclear generation ended on 15 April 2023.
Sources: Company and Moody's Investors Service

EnBW's majority shareholders are the Land of Baden-Wuerttemberg and Zweckverband Oberschwaebische Elektrizitaetswerke, an association of nine administrative districts. Each entity holds a stake of 46.75% via subsidiaries. A further 4.05% is owned by several municipal associations in Baden-Wuerttemberg, with the remainder held by EnBW as own shares or free float (below 0.5%) on the Frankfurt and Stuttgart stock exchanges. The market capitalisation of EnBW on 09 January 2024 was around €21.3 billion.

Detailed credit considerations

System-Critical Infrastructure (SCI): Expansion of regulated electricity and gas networks will require large capital spending, accompanied by gradually increasing cash earnings

The economics of EnBW's SCI segment are mainly determined by its earnings and capital spending related to power and gas distribution grids, mainly operated by its subsidiary Netze BW GmbH; gas transport (ONTRAS Gastransport GmbH, terranets bw GmbH); and electricity transmission (TransnetBW GmbH). The operation of these grids occurs under the German regulatory framework, which we regard as well defined, with key aspects of the revenue building block enshrined in law, and designed to provide adequate and fair remuneration for operating expenses and capital spending.

However, German energy regulation offers less public transparency than that of Western European peers, illustrated by the fact that not all key regulatory parameters, such as a detailed financial model or the regulated asset base (RAB), are publicly disclosed. In addition, the regulator Bundesnetzagentur (BNetzA) often releases decisions sequentially and with a delay.

On 2 September 2021, the European Court of Justice ruled that Germany failed to comply with the obligation of complete independence of the energy regulator from the government. Although we expect the independence and transparency of BNetzA to increase in the future, the process and the timing of the implementation of necessary changes remain uncertain.

Regulatory periods (RP) comprise five calendar years, with electricity grid operators having just entered the first year of the fourth RP (2024-28) whereas gas grid operators started their fourth RP one year earlier.

Notable features of the regulatory framework include:

» A regulatory account mechanism under which certain volume and cost deviations in year t are offset over three years (t+3 through t +5);

» Cost-inflation adjustments, offset against company-specific (X-Ind) and sector-wide general productivity factors (X-gen, separate for electricity and gas) to provide incentives to increase cost efficiencies;

» Cost of debt essentially treated as a pass-through item, notwithstanding some efficiency evaluation by BNetzA;

» Capital returns through depreciation and a return on equity (RoE) based on the RAB.

Depreciation and the RoE constitute the main source of grid operators' cash earnings and are a function of the RAB evolution. The RAB is calculated under the capital cost adjustment (CCA) model[1], which is aimed at including new investments in the RAB without delay in the year of the investment, thus ensuring faster cash remuneration for all capital spending.

In October 2021, the RoE was set by BNetzA at a significantly lower level in the fourth RP than that in the third period, namely 5.07% against 6.91% (nominal, pretax and post-trade tax), principally because of cuts in the risk-free rate (see Exhibit 5)[2]. On 7 June 2023, BNetzA published a proposal for amending equity returns on new grid investments with effect from 2024 and valid through the end of the fourth RP to reflect the recent rising interest rates. Following a consultation period, the implementation of the proposal (see our Sector Comment for details) was confirmed with only minor changes in early December 2023.

The core of the proposal is the annual update of the risk-free rate to reflect market conditions in any given year through 2028 (gas: 2027), as opposed to the current approach of setting a rate based on a long-term, backward-looking index that is fixed for the entire RP. We expect a moderate boost to EnBW's cash flow because the existing RAB does not benefit from the proposed higher equity returns.

Exhibit 5
Evolution of allowed equity returns in Germany for electricity and gas grids

	1st Period (2009-2013)	2nd Period (2014-2018)	3rd Period (2019-2023)	4th Priod BNetzA Final Determination October 2021 (2024-2028)	Proposal June 2023 CCA 2024
Risk-free rate	**4.23%**	**3.80%**	**2.49%**	**0.74%**	**2.79%**
Market risk premium	4.55%	5.44%	3.80%	3.70%	3.70%
Equity beta	0.79	0.66	0.83	0.81	0.81
Equity risk premium	3.59%	3.59%	3.15%	3.00%	3.00%
Risk surcharge				0.40%	
Cost of equity (post tax) - new assets	7.82%	7.39%	5.64%	4.13%	5.79%
Cost of equity (pre-tax) - new assets	**9.29%**	**9.05%**	**6.91%**	**5.07%**	**7.09%**
Inflation factor	1.45%	1.56%	1.46%	1.27%	
Cost of equity (pre-tax) - old assets	**7.56%**	**7.14%**	**5.12%**	**3.51%**	

Under the German regime, the cost of equity allowance differs for assets acquired or built before 2006 (old assets) and after 2006 (new assets). Old assets receive a real equity return adjusted for inflation and new assets receive a nominal return.
Sources: Bundesnetzagentur and Moody's Investors Service

The X-gen electricity factor for the fourth RP has yet to be published by BNetzA (0.9% per year in the third RP), while the one for gas was raised to 0.75% per annum from 0.49% in the third RP. A low X-gen for electricity would be credit positive because it would allow operators to retain most of the regulatory cost inflation adjustments. As for X-Ind, EnBW's electricity grids are mostly solidly positioned in the highest decile against the benchmark, although scores for the gas grids are slightly weaker, which means that the pressure to achieve cost efficiencies is higher. However, in September 2023, the Federal High Court decreed that BNetzA's efficiency test for gas distribution grid companies was flawed and needs to be revised. Thus, there is upside potential for the relevant EnBW subsidiaries.

The relatively stable and predictable cash flow from regulated network activities underpins EnBW's plan to incur €7 billion in capital spending in the SIC segment over 2023-25. This includes €5.1 billion on electricity grids to connect renewables, digitise the grids and build regional sections of large north-south DC connections: SuedLink (TransnetBW together with Tennet Holding B.V. [A3 stable]) and ULTRANET (TransnetBW partnering with Amprion GmbH [Baa1 stable]).

Because most of the planned capital spending (€2.8 billion) is on TransnetBW, EnBW sold 49.9% of the company in equal parts to Suedwest Konsortium Holding GmbH, a group of institutional and corporate investors from Baden-Wuerttemberg, and Expand Netzbetreiber GmbH, a subsidiary of state-owned lender Kreditanstalt fuer Wiederaufbau (Aaa stable) in 2023. Following the announcement of the sale to KFW, news agency Reuters reported a purchase price of around €1 billion from each new shareholder, which has not been confirmed by EnBW.

The new minority shareholders will contribute pro rata additional capital as needed, thus mitigating EnBW's funding needs but at the same time increasing the share of minorities in its capital structure. EnBW as majority owner will continue to consolidate the entity in its financial statements. The sale slightly weakens the business risk profile of EnBW, but based on TransnetBW's corporate accounts, which are publicly available through 2021, we estimate the company's contribution to group EBITDA to be around 5% (based on 100% shareholding) or below. Therefore, we do not adjust our financial ratio guidance at this time.

Based on the planned capital spending, we expect annual incremental cash earnings from new investments to be around €80 million-€100 million over the next few years and annual EBITDA contribution from the SIC segment, on average, to be €1.5 billion-€2 billion, taking into account the volatility in energy prices and the regulatory account movements. The segment's operating cash flow is not likely to be sufficient to cover its capital spending through the end of the decade.

Sustainable Generation Infrastructure (SGI) - Renewable Energies: Capacity expansion will boost cash flow, likely from 2025

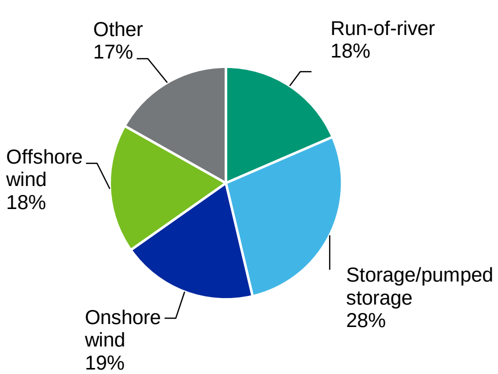
EnBW has a large and well-diversified portfolio of renewable energy assets (RES), with an installed capacity of around 5.7 gigawatts (GW) as of 30 September 2023, including 2.5 GW of hydro generation assets (run-of-river and pumped storage); 1.2 GW of onshore wind; 1 GW each of offshore wind and solar; and 0.1 GW of other RES. Through 2025, the company aims to have 6.5 GW-7.5 GW RES installed, representing more than 50% of its total generation capacity, up from 42% in 2022.

At around 90%, installed RES capacity is overwhelmingly located in Germany, with the remainder in France (through the acquisition of VALECO, an independent French wind and solar energy operator), Sweden and the Czech Republic[3]. Although EnBW's secured RES pipeline and projects under development, including early stage, of nearly 21 GW are focused on Germany for new onshore wind and solar, most of its offshore wind expansion is likely to happen in the UK seas.

Exhibit 6

EnBW has a diversified portfolio of renewables

Installed capacity (2022)



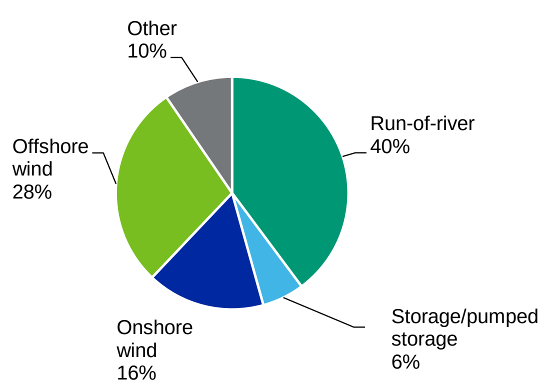
Total capacity: 5.4 GW.

Sources: Company and Moody's Investors Service

Exhibit 7

Hydro accounts for the bulk of renewables generation

Output (2022)



Total generation: 11.7 terawatt hours (TWh).

Sources: Company and Moody's Investors Service

EnBW's offshore wind capacity to double in Germany by 2025, UK expansion dependent on auctions

In spring 2023, EnBW made the final investment decision (FID) to build the He Dreiht offshore wind farm with an installed capacity of 960 megawatt (MW), which is the first offshore wind project in Germany without subsidies. In line with EnBW's four existing operational offshore farms, the company retains a 50.1% majority ownership, with the remainder held by various infrastructure investors. In addition to the sponsors' equity, the €2.4 billion in capital spending is funded by a €600 million loan from the European

Investment Bank (Aaa stable) and a €500 million club loan secured by the Danish export credit agency EIFO. The project in the German North Sea is likely to be commissioned in 2025.

EnBW has closed 15-year PPAs with a current aggregate capacity of 455 MW with renowned German corporates, including a subsidiary of Deutsche Telekom AG (Baa1 stable), chemical firm Evonik Industries AG (Baa2 stable), engineering company Robert Bosch GmbH and others. These PPAs reduce the project's merchant exposure but in turn incur counterparty risk and do not offer the same predictability as a fixed-tariff subsidy regime. Subject to the closing of additional PPAs, He Dreiht is mainly a merchant-based project, which we deem to have significantly higher risk than other types of RES because of its exposure to both output and power price volatility, although it benefits from feed-in priority.

In the UK, in collaboration with BP p.l.c (A2 positive), EnBW was successful in bidding at two seabed lease auctions:

» Round 4 UK auction (2021): Two projects (Morgan and Mona) with a combined capacity of 3 GW; option fee deposit of €268 million for each project to be paid annually from 2023 until a lease contract has been signed. If built, the two offshore wind farms could become operational from 2028/29.

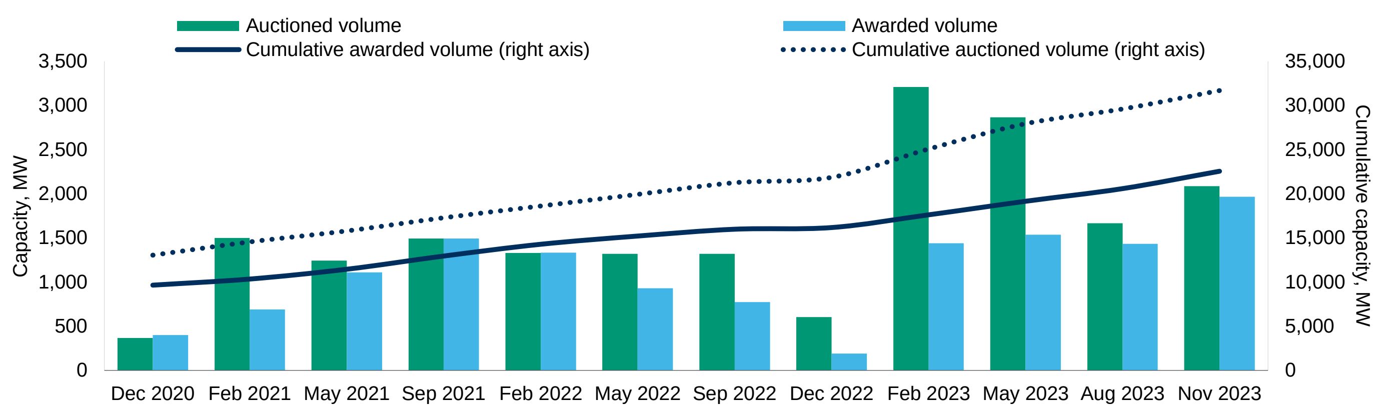
» ScotWind auction (2022): Morven project, with a capacity of 2.9 GW, which could become operational by 2030.

FIDs for these projects have yet to happen, but cost inflation on the supply side and higher interest have exerted significant pressure on the economics for offshore wind (see Sector In-Depth), which resulted in no participation of offshore wind projects in the most recent UK auction round (AR) 5 for contracts-for-difference (CfDs) in September 2023 (see Sector Comment). To attract bids in AR 6, which is scheduled for March 2024, the UK government has raised the administrative price to around GBP100/megawatt hours (MWh) in 2023 prices, up from GBP56/MWh in AR 5 and significantly above current prices of around GBP70/MWh.

Because neither supply costs nor interest are likely to decrease substantially over the next 12-18 months and annual option fees need to be recovered, we expect EnBW and BP p.l.c to decide on an FID by early 2025.

Large-scale solar profitable on merchant basis; onshore wind in Germany remains dependent on support payments
As a result of the less cumbersome permitting procedures and declining equipment costs, solar on a large scale has reached profitability on merchant terms, and EnBW is developing more than 3.2 GW, mainly in Germany and Sweden. In contrast, onshore wind projects, in which EnBW has more than 4 GW under development with 90% to be based in Germany, require support payments to ensure profitability.

Exhibit 8
Onshore wind auctions in Germany remain undersubscribed
Auctioned and awarded capacity in German onshore wind auctions (December 2020 - November 2023)



The auctioned volume generally follows values laid out in the Renewables Act (§28 EEG 2023) but can be adjusted, for example, if an auction is likely to be undersubscribed.
Sources: Bundesnetzagentur and Moody's Investors Service

Since the February 2022 auction, bids have persistently been lower than auctioned volumes. The main reasons for this are rising costs (see offshore) in combination with slow permitting times, which have not been matched by the reference price determined by BNetzA.

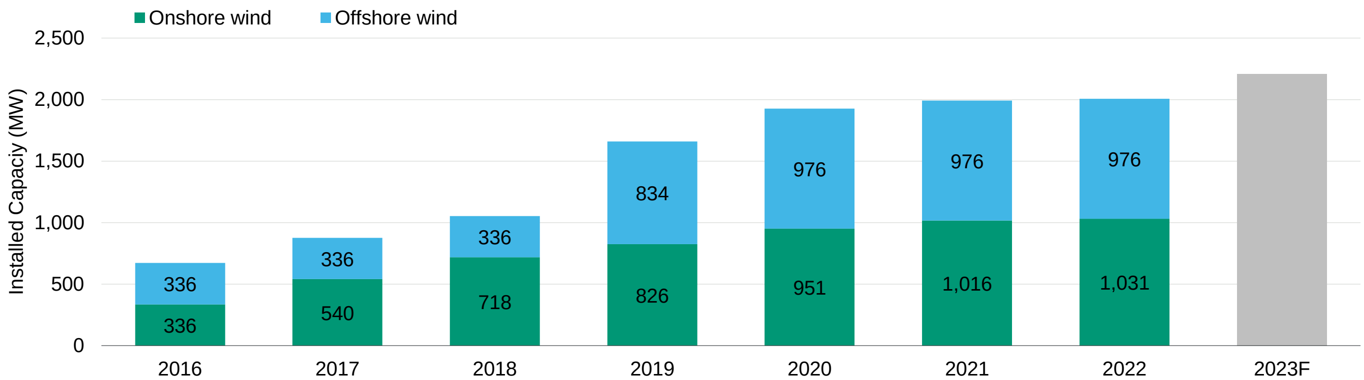
For 2024, this price, which acts as a cap, has remained unchanged at €73.50/MWh because BNetzA assumes it will attract enough bids to meet the planned build-out trajectory for Germany. This trajectory foresees 115 GW installed wind onshore capacity by 2030, up from 61 GW as of year-end 2023.

We estimate that EnBW commissioned around 150-200 MW of new wind onshore projects in Germany in 2023, which we assume to have been mostly underpinned by the 2021 auction awards that were capped at €60/MWh[4]. Since the 2022 reference price was lower at €58.80/MWh, we do not expect significant wind onshore capacity to come online before 2025. We therefore deem it likely that installed solar capacity will exceed that of onshore wind in 2024.

Exhibit 9

EnBW's onshore and offshore wind capacity has increased steadily

Onshore and offshore wind capacity (MW)



Sources: Company and Moody's Investors Service

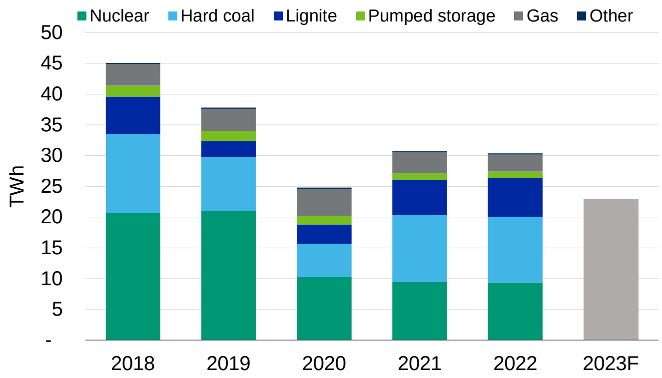
For 2023, EnBW provided EBITDA guidance for RES at €1 billion, and thus below that of 2022 (€1.1 billion), driven by reduced prices, which more than offset the improved wind and hydro yields and capacity growth. Assuming that the capacity growth in 2024 will primarily come from solar and taking into account forward prices of €75/MWh-€100/MWh for the second to fourth quarters of 2024, we expect RES' EBITDA 2024 to remain at a level similar to that of 2023. However, we also expect an increase in EBITDA in 2025, subject to resource risk, when additional onshore wind capacity and He Dreiht come online.

SGI - Thermal Generation and Energy Trading: Coal phase-out target brought forward to 2028; switch to gas-fired capacity will enable earnings from flexibility offerings

As of year-end 2023, EnBW (co-)owned and operated a diversified conventional generation fleet with an installed capacity of around 6.4 GW, including around 4.3 GW of coal and lignite plants and nearly 1.2 GW of gas-fired capacity. EnBW's last nuclear plant was closed as planned in mid-April 2023. Although the company has not disclosed its output from own conventional generation in 2023, we assume the combination of higher RES output supplied to the market, the decline in electricity consumption and reduced gas prices will have led to a reduction in generation from EnBW's coal and lignite plants, exacerbated by the unplanned outage of block 7 of its Heilbronn coal plant for almost the entire year.

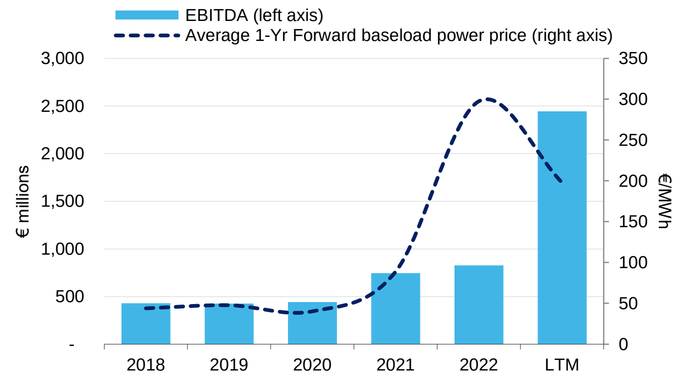
Overall, we estimate that conventional generation output in 2023 may have declined by around 20%, or 6 TWh-7 TWh, compared with that in 2022, but high prices locked in through hedging in earlier years should lead to an EBITDA contribution of €3.3 billion-€3.6 billion from Thermal Generation and Trading in 2023, also underpinned by the absence of the adverse gas supply effects in 2022.

Exhibit 10
Lower conventional generation output in 2023 as a result of nuclear exit and a large coal plant outage
Output in TWh



Sources: Company and Moody's Investors Service

Exhibit 11
Because of EnBW's hedging of generation, EBITDA development follows electricity prices with a time lag
EBITDA in € millions, average one-year forward price in €/MWh

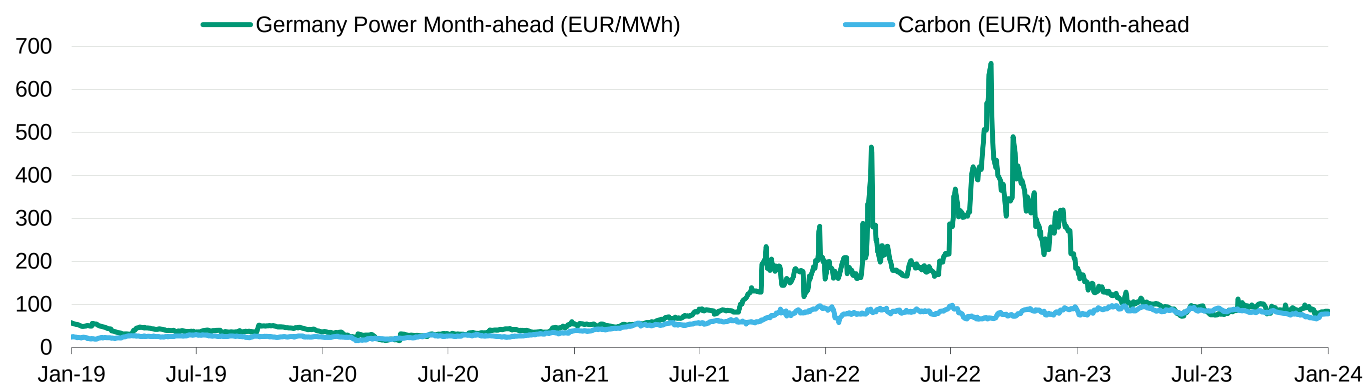


Adjusted EBITDA Thermal Generation and Trading.
Sources: Company, FactSet and Moody's Investors Service

Following the spike in gas and electricity prices in 2022, largely as a consequence of Russia's invasion of Ukraine, the combination of significant demand reduction and the fast build-out of LNG import infrastructure, enabling European countries to replace Russian pipeline gas, has helped calm markets and led to reduced gas prices, with electricity prices following suit as a result of the merit order principle. Current one-year forward rates (CAL-25) in Germany are around €90/MWh, around 65% lower than those a year earlier.

Because of the significant forward hedging of its production through 2025, EnBW's exposure to volatility in wholesale electricity prices is relatively low. However, it also implies that earnings from conventional generation in 2024 should be significantly below those in 2023, partly offset by the Heilbronn block 7 going online again in April 2024.

Exhibit 12
German electricity prices have decreased significantly on the back of reduced gas prices and relatively stable CO2 prices



Source: FactSet

Following EnBW's announcement to phase out coal by 2028, which supports the company's 2035 climate neutrality target, we expect a shift in the nature of conventional earnings over the next four to five years from market exposure to income from flexibility offerings that complement the growth in RES and serve to stabilise the energy system and the grid infrastructure.

Currently, EnBW operates several grid-reserve power plants in Germany with a total capacity of 1.7 GW, which are to a large degree remunerated by capacity payments. Another 650 MW of coal plants are expected to move to the grid reserve by May 2024. Most of the rest of the coal fleet is also likely to become grid reserve plants, partly after having undergone a fuel switch to gas[5].

In view of intermittent RES covering an ever-growing share of electricity supply, flexibility markets, in the shape of gas-fired plants, batteries and demand-side response, are evolving to guarantee the stability of the energy system. Because flexibility sources by design have limited operating hours, investments need to be covered, to a large degree, by capacity payments. As a result, in 2023, the German government said that it would present a "power plant strategy" aimed at establishing around 24 GW of gas-fired, hydrogen-ready plants by way of auction tenders for capacity payments. This is yet to be implemented.

Although this shift in conventional generation towards quasi-regulated capacity payments and reduced exposure to energy wholesale markets is generally credit positive, the concurrent increase in the share of RES in the capacity mix comes with resource risk (see our Sector In-Depth report) and exposes an incremental share of earnings to PPA counterparty or merchant risk.

Smart Infrastructure for Customers (SMINC): Earnings in 2023 dented by bmp Greengas GmbH (bmp) insolvency, no significant EBITDA growth likely

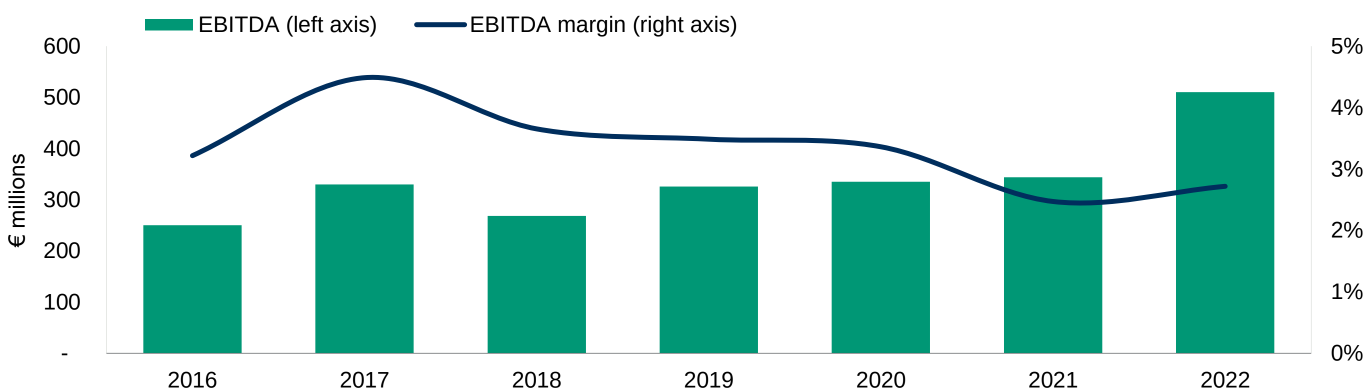
The SMINC segment comprises energy sales to around 5.5 million household and commercial end customers; activities in the fields of new energy solutions (e-mobility, residential solar generation and storage, biomethane); telecommunications (fiber broadband); and energy-related services for smaller utilities. These activities have been contributing around €300 million-€500 million annually to EnBW's EBITDA.

Although the segment provides some earnings diversification for EnBW, most of SMINC's EBITDA will continue to be generated from gas and electricity sales. Thus, it remains exposed to electricity and gas wholesale prices and to customer churn on the back of increased energy prices, mitigated by the company's regional roots and strong brand recognition.

Exhibit 13

SMINC's cost base is largely commodity price-driven, thus EBITDA growth does not necessarily corelate with increased margins

EBITDA and EBITDA margin in the SMINC segment



Sources: Company and Moody's Investors Service

The 2023 result will incorporate charges related to the insolvency of German biomethane trader bmp, indirectly held by EnBW through its subsidiary Erdgas Suedwest GmbH. bmp's difficulties reportedly stem from long-term supply obligations to customers that were not adequately matched by procurement contracts, leading to expensive spot purchases and contract breaches for failure to supply agreed volumes of biomethane, mainly vis-à-vis municipal utilities. In October 2023, EnBW made a binding offer at a reported price of €120 million. Creditors in December approved bmp's insolvency plan and the takeover. EnBW intends to transition bmp to a subsidiary of its gas company, VNG AG, following the conclusion of the insolvency proceedings. As of Q3 2023, EnBW had recorded bmp-related charges of €277 million.

The SMINC segment is likely to grow in volume as solutions, especially EV charging and broadband are rolled out, but ramp-up costs including expenses for staff and IT and the fact that competitors follow similar strategies will limit the potential for EBITDA growth over the next few years.

Strong credit metrics in 2023 will likely weaken through 2025 as hedges roll off and investments increase

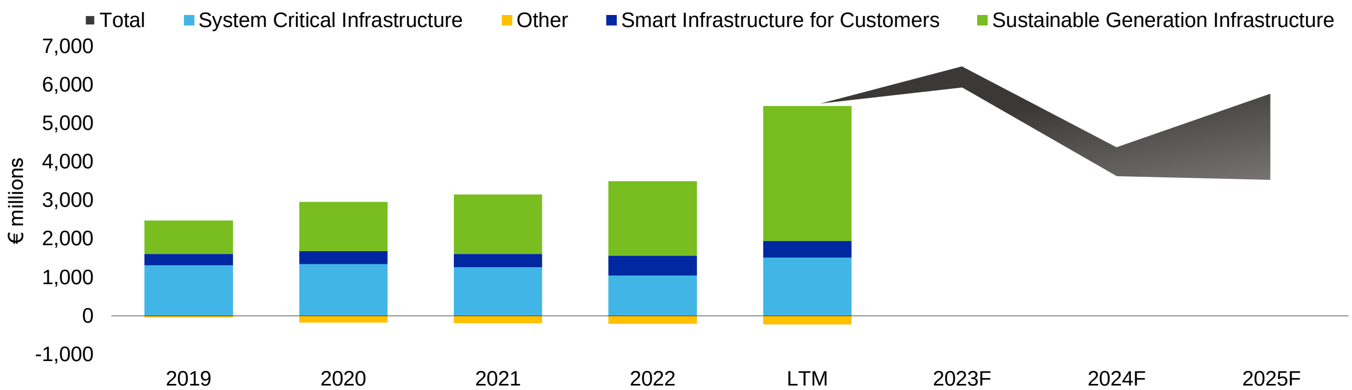
As of the 12 months that ended September 2023, EnBW's key credit metrics, specifically FFO/net debt and RCF/net debt of around 23% and 20%, respectively, were comfortably above our guidance. Considering the company's revised 2023 guidance for adjusted

EBITDA (as defined by the company) between €5.9 billion and €6.5 billion, we expect the full-year metrics to be very strong, noting that EnBW has a track record of meeting or surpassing its guidance (in 2022, adjusted EBITDA of €3.3 billion exceeded the upper guidance end of €3.2 billion).

Exhibit 14

Favourable generation hedges boost EnBW's earnings in 2023 to a level unlikely to be achieved again through 2025

Adjusted EBITDA breakdown, in € millions



Sustainable Generation Infrastructure combines the former Renewable Energies and Generation & Trading segments from 2019 and 2020. Moody's forecasts (F) are Moody's opinion and do not represent the views of the issuer.

Sources: Company and Moody's Investors Service forecasts

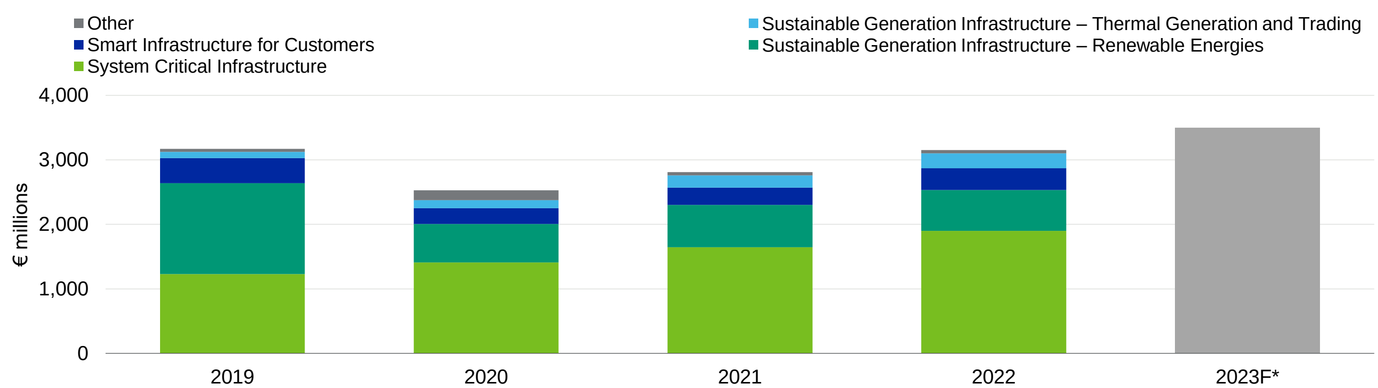
Although the 2023 results will only be released in late March 2024, we expect FFO to have been largely absorbed by working capital outflows for renewable support payments in the context of TransnetBW's agency role and cash outflows from margin calls collateral as hedges have unwound. Thus, additional debt had to be raised to fund investments, but the impact on net debt has been tempered by a discount rate-driven decrease in pension liabilities (€300 million over the first nine months of 2023) and reduced nuclear liabilities as we estimate their use at around €500 million for the year to dismantle decommissioned plants.

We expect EnBW's net debt to continue to be affected by the level of discount rates. In this regard, the company's asset-liability management strategy is to limit the annual outflow from operating cash flow to €370 million (adjusted for inflation). This will depend, however, on a variety of assumptions, including returns on the financial portfolio. Therefore, interest rate movements will remain a key factor because of large financial liabilities and assets on EnBW's balance sheet.

Over the next 12-18 months, we expect credit metrics to weaken (see Exhibit 1) as hedges for generation sold forward at high prices roll off and investment volume increases, but we expect EnBW to remain above our guidance for the current rating.

Exhibit 15

Gross investments are mainly directed towards networks



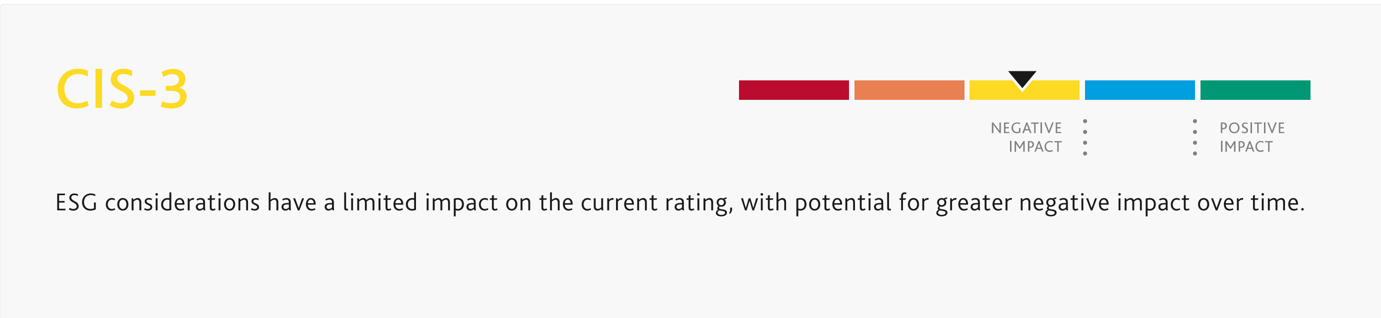
Source: Company

However, the financial ratios are somewhat overstated, since EnBW has a relatively high portion of minorities in its capital structure but consolidates all of the cash flow. This trend is further emphasised by the sale of a minority stake in TransnetBW.

ESG considerations

EnBW Energie Baden-Wuerttemberg AG's ESG credit impact score is CIS-3

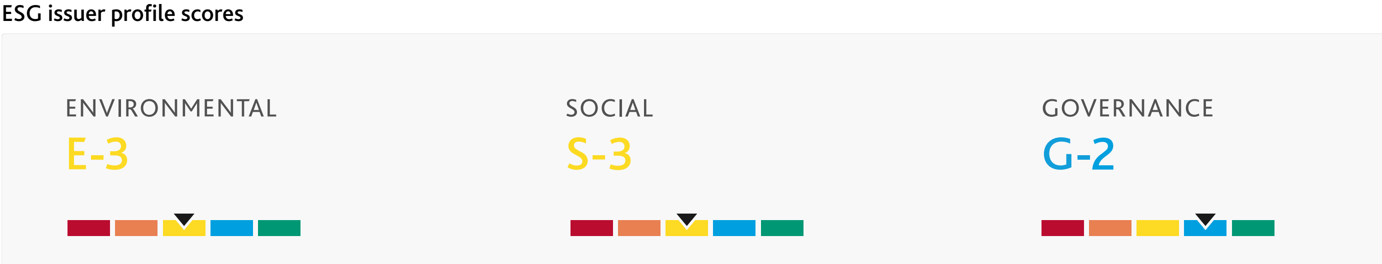
Exhibit 16
ESG credit impact score



Source: Moody's Investors Service

EnBW's ESG Credit Impact Score is moderately negative (**CIS-3**), indicating that its ESG attributes are overall considered as having a limited impact on the current rating, with greater potential for future negative impact over time. The CIS-scoring reflects moderately negative environmental and social risks, partly offset by low to neutral governance risks.

Exhibit 17
ESG issuer profile scores



Source: Moody's Investors Service

Environmental

EnBW's exposure to environmental risk is moderately negative (**E-3** issuer profile score) and reflects the company's carbon transition risks associated with its German coal operations, which the company announced to phase out by 2028. It also incorporates a degree of physical climate risks where the company's network operations (27% of 2022 reported adjusted EBITDA) could get damaged in case of flooding. The score also incorporates the company's liabilities associated with nuclear waste, although this is mitigated by a dedicated assets portfolio, thereby limiting operating cash outflows. Lastly, the **E-3** IPS also reflects an increasing investment programme to increase the share of power output from renewables.

Social

EnBW's exposure to social risks is moderately negative (**S-3** issuer profile score) and reflects the risk that demographics and societal trends could lead to public concerns over affordability. These pressures can trigger adverse political intervention as shown in the temporary introduction of an excess revenue tax for utilities in 2022/23. Similarly, the mandate of the national grid regulator to protect end-users from high fees exposes the company to the risk of adverse decisions. Together, EnBW's networks and retail operations represented 39% of reported adjusted EBITDA in 2022.

Governance

EnBW's governance risk is neutral-to-low (**G-2**). EnBW's credit quality benefits from the ownership by the Land of Baden-Wuerttemberg, which holds 46.75% of the shares. As a government-owned company, we assess that the independence of EnBW's board is relatively weak and that its management may face competing priorities. In addition, EnBW's organisational structure is marked by a gradual increase of subsidiaries with large minority stakes, notably for larger renewable projects, but also recently at TransnetBW, a key subsidiary in charge of electricity transmission in southwest Germany. Nonetheless, governance risks are balanced by other considerations associated with government ownership, including transparent reporting and oversight as well as a solid track record of achieving financial budgets.

ESG Issuer Profile Scores and Credit Impact Scores for the rated entity/transaction are available on Moodys.com. In order to view the latest scores, please click here to go to the landing page for the entity/transaction on MDC and view the ESG Scores section.

Government support considerations

EnBW is 46.75% owned by the Land of Baden-Wuerttemberg, one of the most prosperous states in Germany. Because of the high ownership, we consider EnBW a GRI.

EnBW's focus on its home region implies a high default dependence on the Land of Baden-Wuerttemberg. Our assumption of a moderate probability of support by Baden-Wuerttemberg in case of financial distress at EnBW is underpinned by the company's strategic importance to the region and the shareholder's endorsement of EnBW's strategy. However, it also acknowledges that Baden-Wuerttemberg does not own a majority in EnBW, which may limit a timely intervention.

Liquidity analysis

We expect EnBW to maintain good liquidity over the next 12 months, supported by operating cash flow and cash on balance sheet, and undrawn amounts under committed bank facilities.

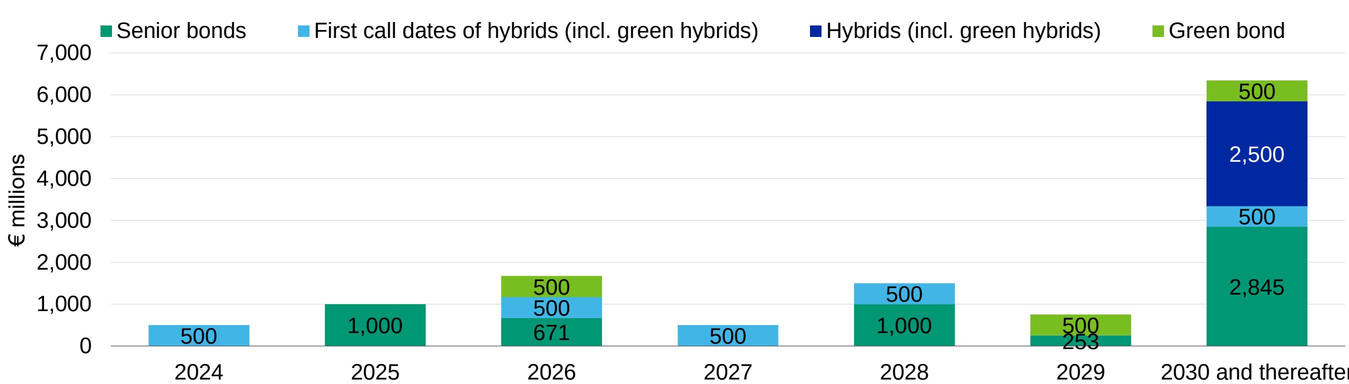
As of the end of September 2023, EnBW had cash and short-term investments (excluding trapped cash) of around €6.1 billion, and a committed €1.5 billion undrawn syndicated facility, due in 2027. In addition, EnBW had undrawn bilateral credit lines of €4.8 billion, of which €3.3 billion was committed. In November 2023, the company raised a further €1.5 billion in cash through a successful green bond issuance.

Assuming annual investments of around €4.6 billion-€4.7 billion, €1 billion debt repayments in the first half of 2025 and dividends payments of €600 million-€700 million in 2024, we deem EnBW's available liquidity to be sufficient to cover these outflows.

Exhibit 18

EnBW has a well-spread debt maturity profile

Notes outstanding as of 30 September 2023, in € millions



Sources: Company and Moody's Investors Service

Structural considerations

EnBW's capital structure includes a mix of senior unsecured bonds, bank debt and hybrid securities that are largely located at the level of the rated parent company or the dedicated funding subsidiary EnBW International Finance B.V., which is the issuer of senior bonds and fully guaranteed by the parent. We estimate that around 10%-15% of debt, including leases, sits at the level of subsidiaries over which EnBW has control as sole or majority shareholder. Therefore, we do not apply notching.

As of year-end 2023, EnBW had five hybrids outstanding, amounting to €2.5 billion. Because of the features of the hybrids, we treat them as 50% debt and 50% equity in financial leverage calculations.

Methodology and scorecard

EnBW is assessed in accordance with our Unregulated Utilities and Unregulated Power Companies rating methodology, published in December 2023, and our Government-Related Issuers Methodology, published in February 2020.

Exhibit 19

Rating factors

EnBW Energie Baden-Wuerttemberg AG

Unregulated Utilities and Unregulated Power Companies Industry	Current LTM 9/30/2023		Moody's 12-18 Month Forward View*	
Factor 1 : Scale (10%)	**Measure**	**Score**	**Measure**	**Score**
a) Scale (USD Billion)	Aa	Aa	Aa	Aa
Factor 2 : Business Profile (40%)				
a) Market Diversification	Ba	Ba	Ba	Ba
b) Hedging and Integration Impact on Cash Flow Predictability	A	A	A	A
c) Market Framework & Positioning	Ba	Ba	Ba	Ba
d) Capital Requirements and Operational Performance	Ba	Ba	Ba	Ba
e) Business Mix Impact on Cash Flow Predictability	Aaa	Aaa	Aaa	Aaa
Factor 3 : Financial Policy (10%)				
a) Financial Policy	Baa	Baa	Baa	Baa
Factor 4 : Leverage and Coverage (40%)				
a) (CFO Pre-W/C + Interest) / Interest (3 Year Avg)	6.5x	Baa	6x - 6.7x	Baa
b) (CFO Pre-W/C) / Net Debt (3 Year Avg)	24.6%	Baa	18% - 25%	Baa
c) RCF / Net Debt (3 Year Avg)	21.6%	Baa	15% - 22%	Baa
Rating:				
a) Scorecard-Indicated Outcome		Baa1		Baa1
b) Actual Rating Assigned				Baa1
Government-Related Issuer	**Factor**			
a) Baseline Credit Assessment	baa2			
b) Government Local Currency Rating	Aaa			
c) Default Dependence	High			
d) Support	Moderate			
e) Actual Rating Assigned	Baa1			

All figures and ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
LTM = Last 12 months.
*Moody's forward view is Moody's opinion and does not represent the views of the issuer.
Source: Moody's Financial Metrics™ and Moody's Investors Service forecasts

Appendix

Exhibit 20
Peer comparison
EnBW Energie Baden-Wuerttemberg AG

	EnBW AG			Vattenfall AB			CEZ, a.s.			Iberdrola S.A.		
	Baa1 Stable			A3 Stable			Baa1 Stable			Baa1 Stable		
(in $ millions)	FY Dec-21	FY Dec-22	LTM Sep-23	FY Dec-21	FY Dec-22	LTM Sep-23	FY Dec-21	FY Dec-22	LTM Sep-23	FY Dec-21	FY Dec-22	LTM Jun-23
Revenue	38,036	59,023	54,650	21,007	23,789	27,835	10,166	13,827	15,776	46,278	56,859	58,417
EBITDA	3,561	4,086	5,753	6,815	2,570	1,910	3,002	5,730	6,320	13,777	13,459	14,540
Total Assets	81,052	74,178	66,207	86,412	75,974	55,926	53,449	48,248	33,662	161,036	164,866	159,071
Total Debt	25,882	23,722	25,331	21,732	23,958	16,311	8,312	11,606	9,360	55,020	57,374	57,612
Net Debt	12,368	12,227	14,701	3,040	7,521	10,068	7,092	9,989	8,922	50,434	52,456	54,935
FFO / Net Debt	24.1%	27.7%	22.6%	169.4%	50.4%	29.4%	38.3%	55.3%	38.3%	21.7%	20.3%	20.5%
RCF / Net Debt	20.5%	24.0%	19.5%	147.1%	15.2%	22.4%	20.2%	43.9%	-11.7%	15.8%	13.8%	12.7%
(FFO + Interest Expense) / Interest Expense	6.4x	5.0x	5.0x	10.6x	5.4x	4.4x	11.8x	15.5x	7.9x	7.6x	5.5x	4.6x
Debt / Book Capitalization	66.9%	59.8%	57.5%	44.9%	62.3%	50.3%	46.3%	46.0%	39.9%	43.4%	45.1%	45.8%

All figures and ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
LTM = Last 12 months.
Source: Moody's Financial Metrics™

Exhibit 21
Moody's-adjusted debt reconciliation
EnBW Energie Baden-Wuerttemberg AG

(in € millions)	2018	2019	2020	2021	2022	LTM
As Reported Total Debt	**6,996.2**	**8,890.5**	**10,499.6**	**12,134.9**	**13,803.9**	**15,705.9**
Pensions	6,550.9	7,174.5	7,419.1	7,772.5	5,426.0	5,426.0
Leases	426.5	0.0	0.0	0.0	0.0	0.0
Hybrid Securities	(987.6)	(1,489.3)	(1,727.7)	(1,737.8)	(1,244.4)	(1,250.0)
Non-Standard Adjustments	5,518.0	5,512.8	5,056.5	4,589.7	4,241.4	4,043.2
Moody's - Adjusted Total Debt	**18,504.0**	**20,088.5**	**21,247.5**	**22,759.3**	**22,227.0**	**23,925.1**

All figures and ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Periods are financial year-end unless indicated.
LTM = Last 12 months as of 30 September 2023.
Source: Moody's Financial Metrics™

Exhibit 22

Overview of Moody's-adjusted financial data

EnBW Energie Baden-Wuerttemberg AG

(in € millions)	2018	2019	2020	2021	2022	LTM
INCOME STATEMENT						
Revenue	20,815	19,436	19,694	32,148	56,003	51,204
EBITDA	1,989	2,541	2,705	3,010	3,877	5,390
EBIT	737	1,054	1,316	1,454	2,257	3,424
Interest Expense	677	581	512	489	784	784
Net income	(40)	442	469	697	1,151	1,493
BALANCE SHEET						
Net Property Plant and Equipment	16,294	18,553	19,991	20,364	22,705	23,847
Total Assets	39,950	43,207	45,965	71,273	69,504	62,533
Total Debt	18,504	20,089	21,248	22,759	22,227	23,925
Cash & Cash Equivalents	7,995	7,210	7,036	11,883	10,771	10,040
Net Debt	10,509	12,878	14,211	10,876	11,456	13,885
Total Liabilities	34,985	37,290	39,410	64,888	59,296	50,213
CASH FLOW						
Funds from Operations (FFO)	1,862	2,113	2,410	2,620	3,168	3,142
Cash Flow From Operations (CFO)	1,230	553	1,272	7,674	1,933	(189)
Dividends	347	354	432	387	420	435
Retained Cash Flow (RCF)	1,515	1,759	1,978	2,233	2,748	2,707
Capital Expenditures	(1,422)	(1,909)	(2,338)	(2,547)	(2,954)	(3,811)
Free Cash Flow (FCF)	(539)	(1,710)	(1,499)	4,739	(1,440)	(4,435)
INTEREST COVERAGE						
(FFO + Interest Expense) / Interest Expense	3.7x	4.6x	5.7x	6.4x	5.0x	5.0x
LEVERAGE						
FFO / Debt	10.1%	10.5%	11.3%	11.5%	14.3%	13.1%
RCF / Debt	8.2%	8.8%	9.3%	9.8%	12.4%	11.3%
Debt / EBITDA	9.3x	7.9x	7.9x	7.6x	5.7x	4.4x
Net Debt / EBITDA	5.2x	5.1x	5.4x	3.6x	3.0x	2.6x

All figures and ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Periods are financial year-end unless indicated. LTM = Last 12 months as of 30 September 2023.
Source: Moody's Financial Metrics™

Ratings

Exhibit 23

Category	Moody's Rating
ENBW ENERGIE BADEN-WUERTTEMBERG AG	
Outlook	Stable
Issuer Rating	Baa1
Senior Unsecured MTN -Dom Curr	(P)Baa1
Subordinate	Baa3
Other Short Term -Dom Curr	(P)P-2
ENBW INTERNATIONAL FINANCE B.V.	
Outlook	Stable
Bkd Senior Unsecured	Baa1
Bkd Other Short Term -Dom Curr	(P)P-2

Source: Moody's Investors Service

Endnotes

1 The CCA has been applied since the third RP for distribution grid operators and since the start of the fourth RP for transmission system operators.

2 Grid operators filed an appeal against the RoE, and on 30 August 2023, the High Court in Düsseldorf passed a ruling, confirming the methodological approach by BNetzA in principle but requesting the regulator to refine its benchmarking approach for the market risk premium. BNetzA has appealed against the verdict. As a result of a history of the appeals court siding with BNetzA, we do not expect any upside for grid operators.

3 ENBW is also a 50% partner in the Turkish joint venture (JV) Borusan EnBW Enerji, a large operator of wind farms and some hydropower and solar installations. As of 31 December 2022, the total installed capacity of the JV, which EnBW consolidates at equity, amounted to 725 megawatt (MW), which are not included within the 5.7 GW.

4 Average time span between auction award and commissioning for wind onshore in Germany is around two years.

5 Coal plants Altbach/Deizisau, Stuttgart-Muenster and Heilbronn block 7, with an aggregate capacity of 1.17 GW, are planned to be converted to hydrogen-ready gas plants (total capacity of 1.47 GW) through 2026 at an estimated cost of €1.6 billion.

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MOODY'S INVESTORS SERVICE