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INVESTORS SERVICE

CREDIT OPINION
5 June 2019

Update

Rate this Research

RATINGS

Vattenfall AB

Domicile	Sweden
Long Term Rating	A3
Type	LT Issuer Rating
Outlook	Negative

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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Vattenfall AB

Update following a change in outlook to negative

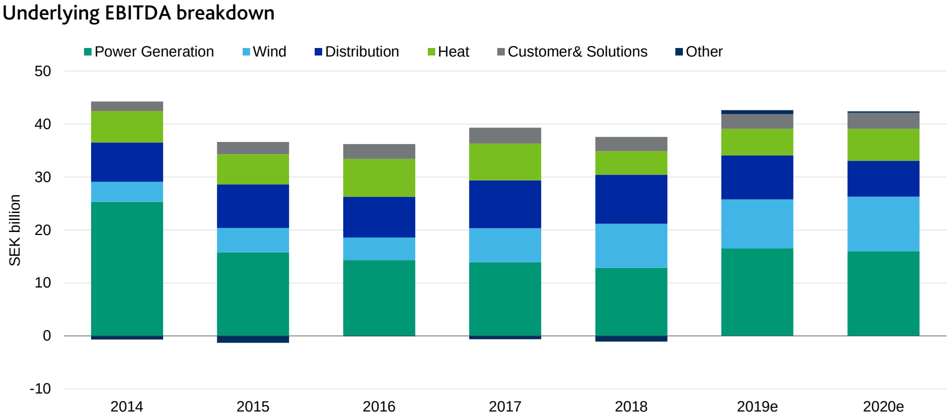
Summary

Vattenfall AB (Vattenfall)'s credit quality is supported by (1) the company's breadth and scale of operations; (2) its clean generation portfolio in the Nordics; (3) moderate contribution from regulated electricity distribution and district heating activities; (4) an increasing contribution from contracted renewables; and (5) a solid financial profile with funds from operations (FFO)/net debt in excess of 20%.

These factors are balanced by (1) Vattenfall's exposure to conventional power generation, which accounted for around 35% of underlying EBITDA in 2018; (2) the competitive environment in retail markets; (3) expected cuts in allowed returns for the distributions networks; and (4) execution risk associated with Vattenfall's strategy to grow its renewable energy portfolio and adapt to the evolving industry of energy services.

Vattenfall's business plan builds upon the progress made in recent years in reshaping the group toward clean energy, with a major focus on investments in renewables and networks, as well as operational efficiency of the existing portfolio. However, the company still maintains a relatively high exposure to merchant power markets and competitive supply as compared with the industry average. This is only partly mitigated by Vattenfall's moderate exposure to decarbonisation risks, given its clean generation in the Nordics.

Exhibit 1
Wind and power generation segments will drive increase in Vattenfall's earnings in 2019
Underlying EBITDA breakdown



The estimates represent Moody's forward view; not the view of the issuer.
Source: Company's reports, Moody's Investors Service

Vattenfall's credit quality benefits from the presence of the Government of Sweden (Aaa stable) as the company's 100% shareholder.

Credit strengths

» Predominantly clean generation mix in the Nordic region

» Solid earnings contribution from regulated and contracted businesses

» 100% state ownership supports credit quality

Credit challenges

» Material earnings contribution from wholesale power markets

» Large capital expenditure programme, which carries some execution risk

» Competition for renewable assets and declining subsidies/move to merchant-based projects

Rating outlook

The negative outlook reflects our expectation that Vattenfall's financial metrics will be weakly positioned against the guidance for the current rating, which includes FFO/net debt around the mid-twenties in percentage terms and RCF/net debt in the high teens in percentage terms.

Factors that could lead to an upgrade

Upward pressure on Vattenfall's ratings is unlikely in the medium term given the negative outlook. The outlook could be changed to stable if it appeared likely that Vattenfall will be able to deliver a financial profile consistent with the guidance for its A3 rating, which includes FFO/net debt around the mid-twenties in percentage terms and RCF/net debt in the high teens. This would further consider any change in the company's business risk profile as Vattenfall continues to implement its strategy.

Factors that could lead to a downgrade

The ratings could be downgraded if (1) Vattenfall's credit metrics appeared unlikely to meet our guidance for the A3 rating; or (2) the share of higher risk cash flows were to increase without a commensurate strengthening of the company's financial profile. A change in the government support assumption could also result in a downgrade of Vattenfall's ratings.

Key indicators

Vattenfall AB

	12/31/2018	12/31/2017	12/31/2016	12/31/2015	12/31/2014
(CFO Pre-W/C + Interest) / Interest	5.1x	4.6x	5.1x	5.7x	5.6x
(CFO Pre-W/C) / Net Debt	22.6%	20.9%	19.1%	22.6%	21.0%
RCF/ Net Debt	19.5%	20.0%	18.1%	22.0%	20.7%

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Source: Moody's Financial Metrics™.

Note: For definitions of Moody's most common ratio terms please see the accompanying User's Guide.

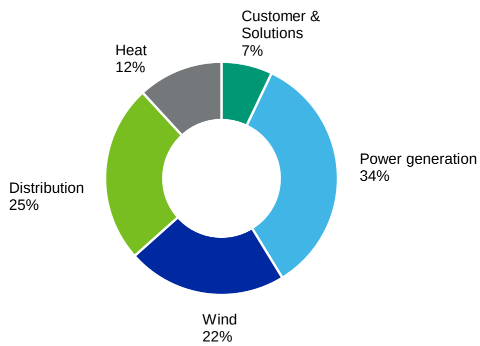
Profile

Vattenfall AB is a 100% Swedish state-owned company. With 31 gigawatts (GW) in installed capacity and 130 terawatt hours (TWh) electricity output, Vattenfall is one of the biggest European energy groups. The company's generation portfolio primarily includes hydro (11.7 GW) and nuclear power (7.2 GW) in Sweden, as well as coal and gas in Germany and the Netherlands. Vattenfall has also an increasing portfolio of wind assets (2.6 GW) and 11.3 GW in installed capacity in heat in Germany, Sweden and the Netherlands. In addition to power and heat generation, Vattenfall owns Sweden's largest electricity distribution network and the electricity distribution grid in Berlin. The company's retail base includes around 6.6 million electricity and 2.3 million of gas customers.

In 2018, Vattenfall derived majority of its earnings in Sweden (81% of underlying operating profit), Germany (7%) and the Netherlands (6%).

Exhibit 3

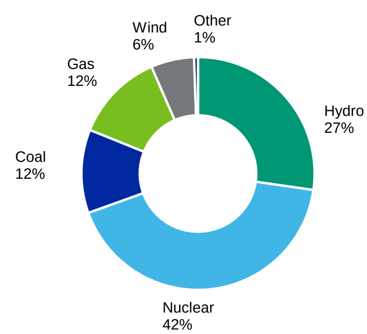
Vattenfall has a diversified business mix
Underlying EBITDA breakdown, in 2018



Total underlying EBITDA of SEK36.5 billion.
Source: Company's reports, Moody's Investors Service.

Exhibit 4

Nuclear and hydro account for the bulk of generation
Breakdown of output, in 2018



Total output of 130 TWh.
Source: Company's reports, Moody's Investors Service

Detailed credit considerations

Strategic focus on shift toward clean energy

Vattenfall's strategy is to drive a transition into a fossil-free society, supported by growth in renewables and maintenance of hydro and nuclear power as baseload capacity. This includes investments in both central and decentralised solutions.

In line with this strategy, the company plans investments of SEK56 billion in 2019-20. Around SEK32 billion of this amount is earmarked for growth capital expenditure (capex), primarily on expansion in onshore and offshore wind (SEK24 billion). Other growth projects include expansion of networks and development of decentralised solutions, such as solar and e-mobility. Maintenance capex is mainly related to investments into distribution networks and modernisation of the heat portfolio, coupled with safety investments in the Swedish nuclear and hydro power plants.

Vattenfall has not provided a target for capex over the medium term. However, given the company's pipeline of offshore and onshore wind projects and focus on efficiency and smart grid solutions, we expect the majority of investments to continue to be directed into renewables and grids.

Profitability of generation supported by recovery in power prices and cuts in Swedish taxes

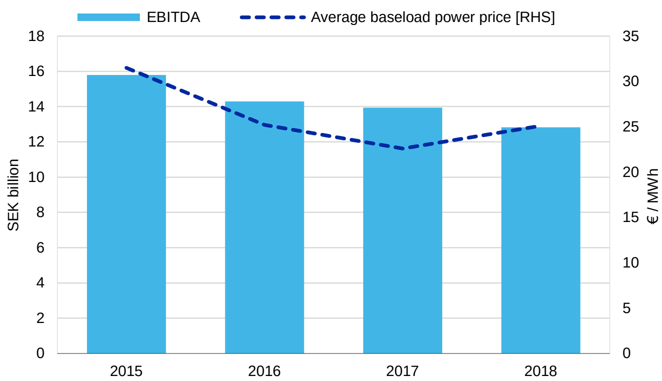
With close to 70% of 2018 output represented by nuclear and hydro, Vattenfall's generation fleet is predominantly fixed-cost in nature, making the company particularly exposed to prevailing wholesale power prices.

Nordic power prices, which are fundamentally a function of European continental power prices, primarily in Germany, have stabilised following a strong rally last year. Baseload power prices in Germany are at around €48/MWh, while power prices in the Nordic region are at some €35/MWh.

Exhibit 5

Vattenfall's earnings are sensitive to changes in power prices

Underlying EBITDA in SEK billion, power price in €/MWh

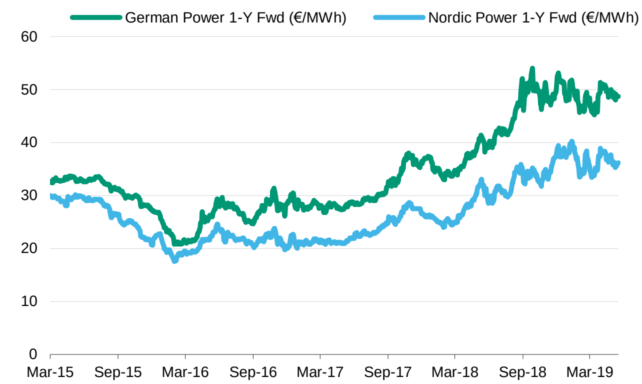


Source: Company's reports, Factset, Moody's Investors Service

Exhibit 6

Power prices have continued a strong rally since early 2018

1-year forward, in €/MWh



Source: FactSet, Moody's Investors Service

Vattenfall's locked-in prices are below current market prices. As of end-March 2019, the company had hedged some 69% of its 2019 Nordic output at €29/MWh. The hedging ratios for 2020 and 2021 are 40% and 23%, with fixed prices of €31/MWh and €33/MWh respectively. Taking into account Vattenfall's generation portfolio in the Nordic region, we estimate that a €1/MWh increase in wholesale power prices will boost operating profits by SEK900 million on an unhedged basis.

As Vattenfall's hedges roll off, we expect earnings from this division to increase, assuming the current level of power prices is sustained. Profitability of this division will continue to be supported by the cuts in nuclear and hydro taxes in Sweden, albeit most of the savings have been already realised, as well as other cost cutting initiatives, including in the nuclear production with a management target of bringing the costs down to SEK190/MWh. The above will be, however, partly offset by the expected decrease in output due to decommissioning of Ringhals 1&2. More generally, the performance of this division will continue to be driven by the hydrological conditions.

Nuclear and hydro taxes in Sweden

In 2016, the Swedish government decided to phase out the nuclear capacity tax and cut hydro real estate taxes in order to support the country's path to free-carbon generation and promote low carbon investments. Nuclear capacity tax of SEK70/MWh was cut by 90% from 1 July 2017 and abolished from 1 January 2018, resulting in annual savings to Vattenfall of around SEK3 billion a year. The cuts to hydro real estate tax, which amounted to SEK85/MWh, are gradually implemented over the 2017-20 period (a tax rate will decline from 2.8% to 0.5% over the period). We estimate the annual savings to Vattenfall at SEK2 billion.

Renewables growth will boost long-term contracted cash flows, but strategy carries some execution risk

Vattenfall's installed capacity in renewables, excluding hydro, amounts to around 3 GW, of which 1.8 GW is offshore wind and 1.2 GW in onshore wind. The company's portfolio of renewables is spread over five European countries (Denmark, Sweden, Germany, UK and the Netherlands), with the UK accounting for more than a third of the installed capacity.

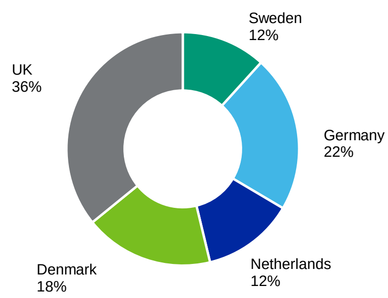
The renewable assets benefit from support schemes, which provide a degree of earnings stability and insulate Vattenfall from wholesale power price volatility. The company's merchant power price exposure in renewables is mainly related to wind farms, for which the subsidy period has expired, the Swedish wind farms under the certificate scheme and the UK wind farm projects under the renewable obligation certificates (ROC) scheme. Over 75% of Vattenfall's revenues is, however, generated from the sale of power based on fixed tariffs, with a remaining subsidy-based contract life of around 10 years. The long-term contracted cash flows under supportive and well-established regulatory regimes underpin Vattenfall's credit quality.

Although renewable subsidies provide lower risk cash flows than merchant generation, wind farms are subject to output variability dependent on wind conditions. This is only partly mitigated by asset and geographical diversification.

Exhibit 7

Vattenfall has a diversified portfolio of renewables

Breakdown of installed capacity, as of end March 2019



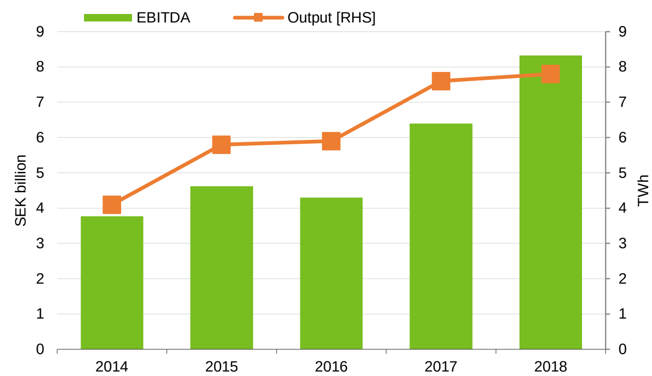
Total capacity of 3 GW.

Source: Company's reports, Moody's Investors Service

Exhibit 8

Wind earnings have increased on the back of capacity additions

EBITDA in SEK billion, output in TWh



Underlying EBITDA as reported.

Source: Company's reports, Moody's Investors Service

Overall, Vattenfall has a good operational track record in its renewable portfolio. However, we still view construction of offshore wind farms as relatively risky compared with other well-established renewable technologies.

Vattenfall has some 1.7 GW of wind projects in construction. These include two Danish offshore wind farms - Horns Rev 3 (407 MW), which has been partially commissioned and will be fully operational this year, and Kriegers Flak (605 MW) which is scheduled to be commissioned in 2021. Other projects are related to onshore wind in the Netherlands and Sweden. The company's pipeline of wind projects under development exceeds 5 GW, which includes the Vesterhav Nord and Syd project (350 MW) in Denmark that was originally scheduled to be commissioned in 2020, but is now delayed by three years due to the requirement for a new environmental study assessment.

Overall, we expect earnings from the wind division to grow to some SEK10-12 billion over the medium term due to a step-up in installed capacity. We currently estimate that the share of revenues generated from the sale of power based on fixed tariff will not materially change in the medium term, but will increase over time, given Vattenfall's pipeline of projects under development.

Merchant-based offshore wind projects bring additional risks

In May 2018, Vattenfall was awarded the contract to build two 350 MW offshore wind farms in the Netherlands. The Hollandse Kust Zuid 1 and 2 project with a total capacity of 700 MW is expected to be commissioned in 2022. Once completed, this will be a first offshore wind farm in Europe operating without any revenue-support framework.

We view merchant-based offshore wind projects as significantly higher risk than other types of generation. This is because of their exposure to both output and power price volatility. While Vattenfall may be able to mitigate some of the risks via power purchase agreements (PPAs), which are becoming more common in Europe, these may not offer predictability equivalent to that of a fixed-tariff subsidy regime and will leave the company exposed to a counterparty risk.

Lower returns will reduce earnings from Swedish networks, uncertainty around the Berlin concession

In 2018, some 25% of Vattenfall's underlying EBITDA was derived from the regulated electricity distribution networks in Sweden and Germany. With EBITDA of SEK7.3 billion, Swedish grids accounted for close to 80% of the total earnings of this division last year.

In Sweden, where Vattenfall is the largest owner and operator of electricity distribution grids, tariffs are subject to a revenue cap model. For the current regulatory period spanning 2016-19, the weighted average cost of capital (WACC) was set at 5.85%. Based on the draft regulation published by the government in August last year, the allowed return will be cut to around 3% for the 2020-23 period. Whilst the final regulatory determination is not expected before November and it is not yet certain if the carry over of the revenue deficit from the previous regulatory period will be allowed, we currently expect that Vattenfall's earnings from the Swedish grids will fall to some SEK4.5-5 billion in the next regulatory period, which will impact the share of regulated earnings in the company's total EBITDA.

Vattenfall's network activities in Germany are solely based in the city of Berlin, where the company operates an electricity distribution grid under a concession. In this regard we note that the city decided to award the concession to another company - Berlin Energie in March this year. Vattenfall challenged the city's decision, which could trigger court proceedings. Their timing is, however, uncertain. The loss of the concession would likely trigger compensation, but it would also further reduce the share of regulated earnings in Vattenfall's business mix. In 2018, Berlin grid generated some SEK2 billion in EBITDA.

We view regulated earnings from distribution grids as lower risk compared with conventional or renewable generation. In this regard, an expected decrease in distribution grid earnings weighs on our assessment of Vattenfall's credit quality.

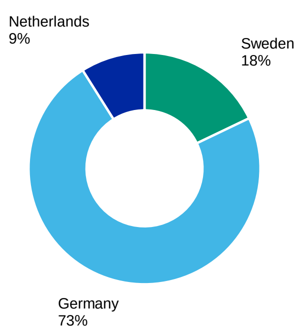
Heat activities add to diversification but profitability has significantly weakened

Vattenfall is one of Europe's largest producers and distributors of heat, supplying electricity and heat to growing metropolitan areas in Northwest Europe, including Berlin, Hamburg, Amsterdam and Uppsala. The German market accounts for the majority of Vattenfall's heat sales - 13.9 TWh out of 18.9 TWh in total in 2018.

We estimate that heat accounted for over 85% of this segment's EBITDA last year. The remainder of earnings was generated from sales of electricity from condensing plants and as a by-product from Vattenfall's CHP plants. The share of heat was significantly higher than in the previous years, reflecting weak spreads affecting profitability of electricity sales.

Exhibit 9

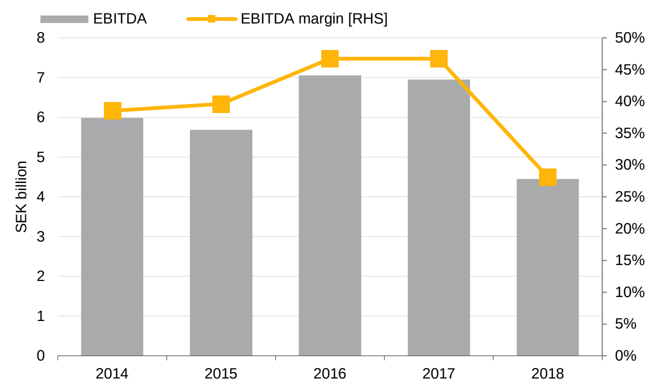
Heat activities are mainly located in Germany
Production of heat, in 2018



Total production of 19 TWh.
Source: Company's reports, Moody's Investors Service

Exhibit 10

Heat earnings are subject to pressure from higher commodity costs
EBITDA in SEK billion



Underlying EBITDA as reported.
Source: Company's reports, Moody's Investors Service

District heating is not a regulated monopoly business but has high barriers to entry and/or is subject to long-term heat contracts. In Germany, a typical length of the contract is 10 years. This compares with 15-30 year concessions in the Netherlands. In contrast, in Sweden, contracts are short-term, but the company benefits from a strong market position with very low churn rates (less than 1%).

We expect profitability of this division to improve as Vattenfall seeks to adapt its portfolio with the phase-out of fossil fuels and plant conversions to CHP eligible for subsidies. However, earnings will be also impacted by the loss of the Hamburg concession following the city's decision last year to buy back the district heating system. The heat business in Hamburg contributed around SEK0.7 billion to Vattenfall's EBITDA in 2018. This loss of earnings will be somewhat mitigated by the cash compensation of €625 million, expected to be received in Q3 2019 and a reduction in net debt mainly related to pension provisions.

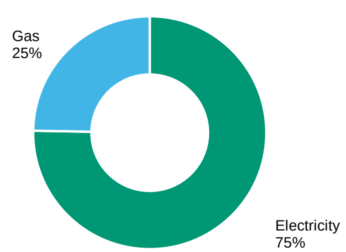
Retail segment provides a strong platform for development of energy solutions

In 2018, the Customers & Solutions segment contributed 7% to Vattenfall's underlying EBITDA. This segment includes supply of electricity and gas to residential, commercial and industrial customers. The company's customer base amounts to 8.9 million customers, with operations in the Nordic countries, Netherlands, Germany, UK and France.

Vattenfall's EBITDA margin in this segment was in excess of 4% in 2016-17. While this presented a significant increase on the 2015 level, the improvement in profitability was primarily due to a reallocation of contracts with resellers (B2B) from this division to the Power Generation segment. Other factors include reduction in administrative and sales costs.

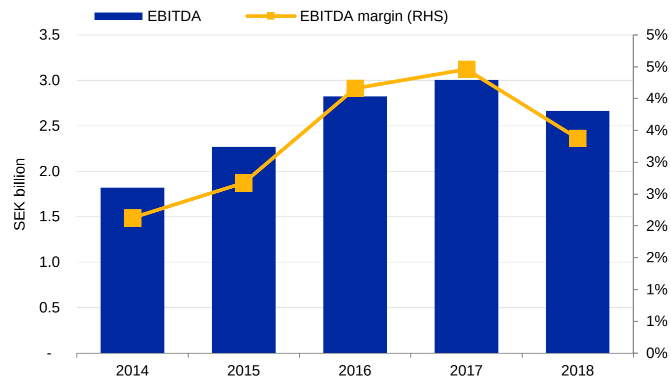
Profitability of this segment deteriorated in 2018 despite higher sales in France and Germany, and expansion in the UK. This reflects a fairly difficult operating environment, given intense competition and regulatory intervention.

Exhibit 11
Electricity accounts for the bulk of Vattenfall's sales
Sales volumes in 2018



Total sales of 231 TWh.
Source: Company's reports, Moody's Investors Service

Exhibit 12
EBITDA margins are coming under pressure
EBITDA in SEK billion



Underlying EBITDA as reported.
Source: Company's reports, Moody's Investors Service

We note that Vattenfall has been actively securing contracts for the supply of renewable electricity (e.g. to a growing number of data centers in the Nordic countries), electric vehicles (EV) charging solutions and other products (e.g. solar panels). Whilst development of new customer solutions supports revenue growth, markets will remain challenging with further pressure on the company's margins.

Adjusted debt impacted by high nuclear and pension liabilities

As of end-December 2018, Vattenfall's total adjusted debt (Moody's definition) of SEK153 billion included around SEK71.6 billion in adjustments related to pension and nuclear liabilities. Some SEK17.8 billion of the total amount was related to German nuclear obligations, which were significantly reduced following the payment of around SEK17.2 billion, of which SEK4.7 billion related to the risk premium required for the externalisation of the liabilities, in July 2017.

We note that Vattenfall is pursuing a case at the Washington-based International Centre for Settlement of Investment Disputes (ICSID) concerning the financial losses caused by the early withdrawal of the operational permits for its German nuclear power plants. The company's claim amounts to €4.4 billion (excluding interest), although there is uncertainty regarding the timing of the decision and any potential benefit to Vattenfall.

Financial ratios are weakly positioned against our guidance and management's stated targets

In 2018, Vattenfall's reported EBITDA of SEK34.3 billion remained broadly flat compared with the previous year. Notwithstanding high investments, the company's adjusted net debt (management definition) decreased to SEK112.3 billion from SEK124.4 billion in 2017, due to strong operating cash flow which was partly driven by the positive working capital attributable to changes in margin calls. Given the timing of some of the margin payment, Vattenfall's adjusted net debt increased already in Q1 2019.

We expect Vattenfall's financial ratios to be weakly positioned against our guidance, which takes account of the company's business risk profile, with the share of regulated, quasi-regulated and contracted earnings at some 50% of EBITDA. Nevertheless, we recognise the potential for the company to deliver stronger financial performance in 2020-21 once new renewable capacity is commissioned and on the back of improvement in power generation earnings once the existing hedges roll off.

Vattenfall's ratios are also weakly positioned against management targets, which include FFO/adjusted net debt (as defined by management) of 22-27%. As of end-March 2019, this ratio stood at 18.1%. Management is committed to achieve an improvement in this key metric to the levels consistent with the stated target in 2019, which would support distributions to Vattenfall's shareholder. The company's dividend policy assumes a pay-out ratio of 40-70% of the consolidated net income.

Government ownership is supportive of credit quality

Vattenfall is the largest electric utility in Sweden, where it accounts for over 55% of domestic power generation - mainly based on hydro and nuclear, owns the largest electricity distribution grid and supplies over 878 thousand retail electricity customers.

Whilst we recognise the strategic importance of the company within Sweden, we also acknowledge the state's determinedly non-interventionist stance. We believe that the authorities would hesitate to intervene (such as through a direct capital injection) except in the most extreme circumstances, i.e. where there is a threat to key strategic Swedish assets such as nuclear and hydro power plants, and its network infrastructure.

Moderate risk from decarbonisation of the power sector

The EU has committed to reduce greenhouse gas emissions by 40% from 1990 levels and to increase the contribution of renewables to energy demand to 27% by 2030. These targets, agreed in 2014, formed the basis of the EU's Nationally Determined Contributions incorporated into the Paris Agreement, and are designed to significantly decarbonise the region's economies. We believe that unregulated utilities, which account for 40% of EU carbon emissions, will need to deliver a significant share of the reductions, and that this will create a variety of risks and opportunities for individual utilities.

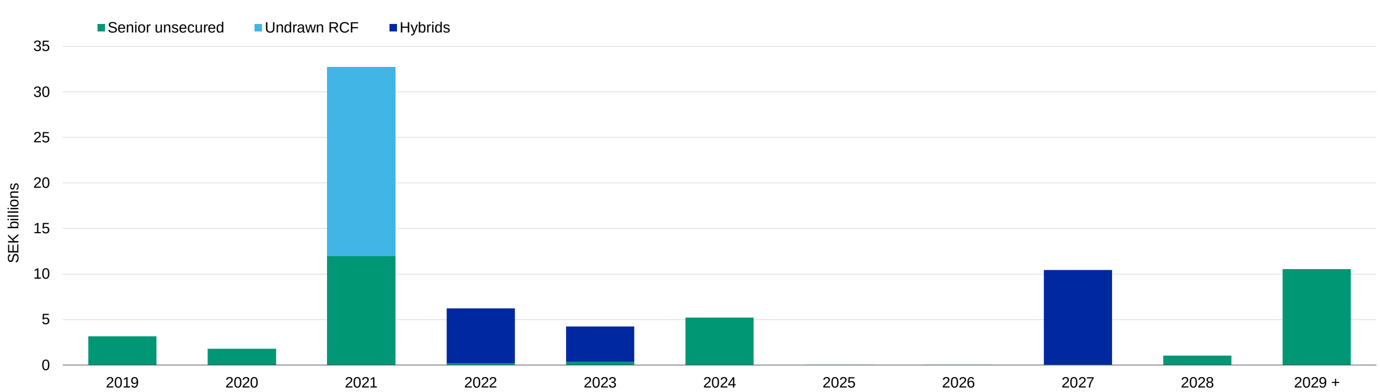
We believe that Vattenfall is moderately well-positioned to face carbon transition risks compared to peers given fairly low-carbon intensity of its fleet (150 g/kWh in 2018), as well as the growing contribution of renewables and regulated activities to its earnings. This is mitigated by its large exposure to large-scale, centralized generation.

Our framework for assessing the risks associated with decarbonisation in this industry is set out in Unregulated utilities and power companies - Global: Carbon transition brings risks and opportunities, published on 26 June 2018.

Liquidity

As of end-March 2019, Vattenfall's liquidity position was supported by (1) SEK26.7 billion of cash and short term investments, and (2) a committed Revolving Credit Facility (RCF) of €2 billion (SEK20 billion). The RCF, which is fully undrawn, expires in December 2021.

Exhibit 13
Vattenfall has a fairly well-spread debt maturity profile
As of end-March 2019



Maturity of hybrids shown at call dates.
Source: Company's reports, Moody's Investors Service

Structural considerations

Vattenfall's capital structure includes a mix of senior unsecured bonds, bank debt and hybrid securities.

As of end-March 2019, Vattenfall had four hybrids outstanding: €1 billion due March 2077, SEK3 billion due March 2077, SEK3 billion due March 2077 and $400 million due November 2078.

Given the features of the hybrids, we treat them as 50% debt and 50% equity for financial leverage calculations.

Rating methodology and scorecard factors

Vattenfall is rated in accordance with the rating methodology for Unregulated Utilities and Unregulated Power Companies, published in May 2017. The company's baseline credit assessment (BCA) on a historical basis is in line with the scorecard outcome.

Given the 100% ownership by the Swedish government (Aaa stable), Vattenfall is considered a Government-Related Issuer (GRI) under Moody's methodology for Government-Related Issuers, published in June 2018. Accordingly, and based on our estimate of moderate support in case of financial distress, the A3 rating factors in one notch of uplift from the company's BCA of baa1.

Exhibit 14

Rating factors

Vattenfall AB

Unregulated Utilities and Unregulated Power Companies Industry Grid [1][2]	Current LTM 3/31/2019		Moody's 12-18 Month Forward View As of June 2019 [3]	
Factor 1 : Scale (10%)	**Measure**	**Score**	**Measure**	**Score**
a) Scale (USD Billion)	A	A	A	A
Factor 2 : Business Profile (40%)				
a) Market Diversification	Baa	Baa	Baa	Baa
b) Hedging and Integration Impact on Cash Flow Predictability	Baa	Baa	Baa	Baa
c) Market Framework & Positioning	Ba	Ba	Ba	Ba
d) Capital Requirements and Operational Performance	Baa	Baa	Baa	Baa
e) Business Mix Impact on Cash Flow Predictability	Aa	Aa	Aa	Aa
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)	5.0x	Baa	4x - 5x	Baa
b) (CFO Pre-W/C) / Net Debt (3 Year Avg)	20.1%	Baa	20% - 22%	Baa
c) RCF / Net Debt (3 Year Avg)	18.4%	Baa	12% - 15%	Ba
Rating:				
a) Indicated Rating from Grid		Baa1		Baa2
b) Actual Baseline Credit Assessment (BCA)		baa1		
Government-Related Issuer	**Factor**			
a) Baseline Credit Assessment	baa1			
b) Government Local Currency Rating	Aaa, stable			
c) Default Dependence	Moderate			
d) Support	Moderate			
e) Final Rating Outcome	A3			

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
[2] As of 12/31/2018; Source: Moody's Financial Metrics™
[3] This represents Moody's forward view; not the view of the issuer; and unless noted in the text, does not incorporate significant acquisitions and divestitures
Source: Moody's Investors Service

Appendix

Exhibit 15

Peer Comparisons

	Vattenfall AB A3 Stable			Iberdrola S.A. (P)Baa1 Stable			EnBW (P)A3 Stable			Statkraft AS Baa1 Stable		
(in US millions)	FYE Dec-16	FYE Dec-17	FYE Dec-18	FYE Dec-16	FYE Dec-17	FYE Dec-18	FYE Dec-16	FYE Dec-17	LTM Mar-18	FYE Dec-15	FYE Dec-16	FYE Dec-17
Revenue	$16,282	$15,837	$18,063	$31,821	$35,323	$41,421	$21,430	$24,828	$27,086	$6,411	$5,887	$7,572
EBITDA	$3,103	$4,170	$4,144	$8,961	$7,762	$10,906	$150	$4,624	$4,918	$884	$1,737	$2,619
Total Debt	$18,699	$18,706	$17,323	$35,890	$48,494	$47,256	$24,388	$22,279	$22,620	$5,289	$4,955	$5,219
Net Debt	$14,214	$15,757	$13,078	$34,375	$44,640	$44,053	$11,146	$10,956	$10,542	$4,211	$4,050	$3,377
(FFO + Interest Expense) / Interest Expense	5.1x	4.6x	5.1x	5.7x	5.3x	5.7x	3.3x	5.4x	5.0x	4.9x	5.5x	6.2x
FFO / Net Debt	19.1%	20.9%	22.6%	18.1%	14.3%	18.4%	16.3%	34.4%	37.4%	17.9%	19.9%	26.8%
RCF / Net Debt	18.1%	20.0%	19.5%	11.5%	9.3%	13.1%	13.6%	33.0%	35.7%	4.1%	19.3%	15.7%
Net Debt / EBITDA	4.9x	3.6x	3.2x	4.0x	5.4x	4.2x	78.0x	2.2x	2.0x	5.2x	2.4x	1.3x

All figures & ratios calculated using Moody's estimates & standard adjustments. FYE = Financial Year-End. LTM = Last Twelve Months. RUR* = Ratings under Review, where UPG = for upgrade and DNG = for downgrade.
Source: Moody's Financial Metrics™.

Exhibit 16

Moody's adjusted debt breakdown

Vattenfall AB

(in SEK millions)	FYE Dec-14	FYE Dec-15	FYE Dec-16	FYE Dec-17	FYE Dec-18
As Reported Debt	**125,928.0**	**110,585.0**	**96,667.0**	**87,154.0**	**88,275.0**
Pensions	42,341.5	37,152.0	40,644.0	41,962.0	39,686.0
Operating Leases	6,522.0	5,604.0	4,212.0	6,198.0	6,984.0
Hybrid Securities	-7,038.8	-9,273.0	-9,582.0	-9,559.0	-9,916.0
Non-Standard Adjustments	23,520.0	25,329.0	37,935.0	27,404.0	28,550.0
Moody's-Adjusted Debt	**191,272.8**	**169,397.0**	**169,876.0**	**153,159.0**	**153,579.0**

All figures are calculated using Moody's estimates and standard adjustments.
Source: Moody's Financial Metrics™

Exhibit 17

Selected Historic Adjusted Financial Data

Vattenfall AB

(in million)	FYE Dec-14	FYE Dec-15	FYE Dec-16	FYE Dec-17	FYE Dec-18
INCOME STATEMENT					
Revenue	165,945	143,576	139,208	135,114	156,824
EBITDA	45,339	33,513	26,532	35,573	35,978
EBIT	25,034	18,119	12,462	19,302	18,517
Interest Expense	6,761	6,163	6,025	7,562	6,411
Net income	14,687	(2,323)	(18,149)	7,916	9,003
BALANCE SHEET					
Net Property Plant and Equipment	276,812	249,432	220,974	233,202	245,531
Total Assets	502,715	467,186	413,098	415,077	469,338
Total Debt	191,273	169,397	169,876	153,159	153,579
Cash & Cash Equivalents	42,018	41,577	40,751	24,148	37,635
Net Debt	149,255	127,820	129,125	129,011	115,944
Total Liabilities	375,089	350,470	335,536	328,630	371,524
CASH FLOW					
Funds from Operations (FFO)	31,320	28,916	24,679	26,950	26,236
Cash Flow From Operations (CFO)	40,375	41,422	31,446	26,617	42,020
Dividends	469	819	1,368	1,177	3,644
Retained Cash Flow (RCF)	30,852	28,097	23,311	25,773	22,592
Capital Expenditures	(29,109)	(28,995)	(23,659)	(20,634)	(22,757)
Free Cash Flow (FCF)	10,798	11,608	6,419	4,806	15,619
INTEREST COVERAGE					
(FFO + Interest Expense) / Interest Expense	5.6x	5.7x	5.1x	4.6x	5.1x
LEVERAGE					
FFO / Debt	16.4%	17.1%	14.5%	17.6%	17.1%
RCF / Debt	16.1%	16.6%	13.7%	16.8%	14.7%
FFO / Net Debt	21.0%	22.6%	19.1%	20.9%	22.6%

All figures and ratios are calculated using Moody's estimates and standard adjustments. Periods are Financial Year-End unless indicated. LTM = Last Twelve Months.

Source: Moody's Financial Metrics™.

Ratings

Exhibit 18

Category	Moody's Rating
VATTENFALL AB	
Outlook	Negative
Issuer Rating	A3
Senior Unsecured	A3
Jr Subordinate	Baa2
Commercial Paper	P-2

Source: Moody's Investors Service

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