The WACC for Drinking Water Companies in the Netherlands

PREPARED BY

Dan Harris
Lucrezio Figurelli
Federico Guatri
Filippo Nezzo

PREPARED FOR

ACM

9 AUGUST 2021

Brattle

NOTICE

This report was prepared for ACM, in accordance with The Brattle Group's engagement terms, and is intended to be read and used as a whole and not in parts.

The report reflects the analyses and opinions of the authors and does not necessarily reflect those of The Brattle Group's clients or other consultants.

There are no third party beneficiaries with respect to this report, and The Brattle Group does not accept any liability to any third party in respect of the contents of this report or any actions taken or decisions made as a consequence of the information set forth herein.

© 2021 The Brattle Group

TABLE OF CONTENTS

I. Introduction and Summary 1
A. Risk-Free Rate 1
B. Equity Risk Premium 2
C. Beta 2
D. Gearing 3
E. Cost of Debt and Debt Premium 3
F. WACC of the Dutch Drinking Water Companies 4

II. The Risk-Free Rate 5

III. The Equity Risk Premium 7

IV. Selection of Peers and Screening Tests 11
A. Potential Peers 11
B. Liquidity Tests 12
C. Regulated Revenues 15
D. M&A Activity 17
E. Credit Rating 17
F. The Final Sample of Peers 18

V. Asset Beta 20
A. Peer Group Equity Betas 20
B. Peer Group Asset Betas 23
C. Asset Beta for Dutch Water Distribution 24
D. Planned Investments and the Risk Profile of the Dutch Drinking Water Companies 26

VI. Gearing 28

VII. Cost of Debt 32
A. Spread on the Generic Industry Bonds 32
B. Spread on the Comparable Bonds 33
1. Generic Utility 33
2. Firms Engaged in Similar Activities to Drinking Water Distribution 34
C. Conclusions on Debt Spreads 36

VIII. WACC 39

Appendix A. Rating Analysis for the Dutch Drinking Water Companies 40
A.I. Moody's Credit Rating Methodology For Regulated Water Utilities 40
A.II. Rating the Dutch Drinking Water Companies 43

Appendix B. Bonds Issued by Firms Engaged in Similar Activities 51

TABLE OF TABLES

Table 1: Summary of WACC Calculation 4
Table 2: Historic Equity Risk Premium Relative to Bonds (1900 – 2020) 8
Table 3: DMS ERP Data 2016 - 2020 10
Table 4: Firms Selected as Potential Peers 12
Table 5: Trading Frequency and Annual Revenues 15
Table 6: Percentage of Regulated Revenues 16
Table 7: Credit Rating 18
Table 8: Screening Tests Summary 19
Table 9: Equity Betas 22
Table 10: Equity and Asset Betas 24
Table 11: Asset Beta for Dutch Water Distribution 25
Table 12: Historical and Expected Evolution of the RAB for the Dutch Drinking Water Companies 27
Table 13: Gearing for Listed European Peers 29
Table 14: Actual Gearing and Likely Rating of the Dutch Drinking Water Companies 30
Table 15: The Average Spreads on the Generic Industry and Comparable Bonds 36
Table 16: WACC for Drinking Water Distribution 39
Table 17: Leverage and Coverage of the Dutch Water Companies (December 2019) 45
Table 18: Likely Rating of the Representative Dutch Drinking Water Company 46
Table 19: Rating of Brabant Water 47
Table 20: Rating of Dunea 47
Table 21: Rating of Evides 48
Table 22: Rating of Oasen 48
Table 23: Rating of PWN 49
Table 24: Rating of Vitens 49
Table 25: Rating of WBG 50
Table 26: Rating of WML 50

TABLE OF FIGURES

Figure 1: Yield on Dutch Government 10-YYear Bonds 6
Figure 2: Eurozone Equity Risk Premiums by Year 9
Figure 3: Bid-Ask Spread 14
Figure 4: Spread of 10-year A-rated European Industrial Debt over 10-year Dutch Government Bonds 33
Figure 5: Spread of the generic A-rated utility Debt over 10-year Dutch Government bonds 34
Figure 6: Spread of A-rated Peers over Relevant Government Bonds 36
Figure 7: Value of Outstanding Bond Issues for Various Firms 37
Figure 8: Moody's Scorecard for Rating Regulated Water Utilities 41

Figure 9: Moody's Score By Rating 42
Figure 10: Moody's Factor Weighting by Rating 42
Figure 11: Moody's Baseline Rating by Overall Score 43
Figure 12: Moody's Rating of Leverage and Coverage Finantial Ratios 43

I. Introduction and Summary

1. The Dutch Authority for Consumers and Markets (ACM) has commissioned The Brattle Group (Brattle) to calculate the Weighted Average Cost of Capital (WACC) for drinking water distribution companies in the Netherlands for the next regulatory period.[1]
2. The ACM has instructed us to calculate the WACC using ACM's general methodology and the relevant prescriptions of the applicable legislation, which are currently under review.[2] More specifically, the ACM has asked us to estimate two WACCs:
   a. **A WACC for the two-year period 2022-2023** (WACC 2022-2023) based on the current methodology; and
   b. **A WACC for the three year period 2022-2024** (WACC 2022-2024) reflecting the proposed amendments to the applicable legislation, which introduce a three-year price control and a number of methodological changes to the calculation of the risk-free rate (RFR) and of the cost of debt.
3. In calculating the WACC, the ACM has further asked us to evaluate:
   a. whether expected developments and required investments in the drinking water sector will affect the risk profile of the Dutch drinking water companies, and
   b. a reasonable level of gearing (D/A) for the Dutch drinking water companies, consistent with a single-A credit rating.
4. In preparing this report, we use data up to and including 30 April 2021 (measurement date), being the most recent data available at the time of our analysis.

A. Risk-Free Rate

5. ACM's current methodology for the drinking water sector specifies the same risk-free rate (RFR) for both the cost of equity and the cost of debt calculation. The two-year and five-year average yield on 10-year Dutch government bonds defines the RFR.
6. The ACM has informed us that the Ministry of Infrastructure and Water Management plans to amend the methodology to calculate a separate RFR for cost of equity and cost of debt. The RFR for the cost

[1] ACM also commissioned Brattle to estimate the WACC for drinking water distribution companies in the Netherlands in 2013, 2015, 2017 and 2019. See, respectively, Dan Harris and Renato Pizzolla, "The WACC for Dutch Drink Water Companies", 28 June 2013 ("Brattle 2013 Report"); Dan Harris, Richard Caldwell, and Ying-Chin Chou, "The WACC for Dutch Drink Water Companies", 3 July 2015 ("Brattle 2015 Report"); Dan Harris, Lucia Bazzucchi, and Flora Triolo, "Update to WACC Parameters for Drinking Water", 28 July 2017 ("Brattle 2017 Report"); and Dan Harris, Lucrezio Figurelli, Flora Triolo and Massimiliano Cologgi "The WACC for Drinking Water Companies in the Netherlands", 9 July 2019 ("Brattle 2019 Report").

[2] The WACC methodology for the drinking water sector is governed by ACM general methodology and the prescriptions of the 'Drinkwaterbesluit' and the 'Drinkwaterregeling'.

of equity will be set using the current methodology. The RFR for the cost of debt will instead be set based on the ten-year average yield on 10-year Dutch government bonds.

7. The two-year, five-year and 10-year averages of the 10-year Dutch government bond yields were, respectively, equal to -0.28%, 0.15%, and 0.88%.
   a. We use the average between the two-year and five-year average yield, equal to -0.06%, as a measure of the RFR for both the cost of equity and the cost of debt in the WACC 2022-2023, and for the cost of equity in the WACC 2022-2024;
   b. We use the 10-year average yield of 0.88% as a measure of the RFR for the cost of debt in the WACC 2022-2024.

B. Equity Risk Premium

8. We calculate the Equity Risk Premium (ERP) using long-term historical data on the excess return of shares over long-term bonds, using data from European markets. Specifically, the methodology requires that the projected ERP should be based on the average of the arithmetic and geometric realized ERP for the Eurozone, using the market capitalization of each country's stock market as weights. The methodology also requires considering whether adjustments to the final ERP need to be made based on considerations of the historical average ERP, and ERP estimates based on dividend-growth models. Based on the available data, we select an ERP of 5%.

C. Beta

9. The Dutch water firms for which we are estimating the WACC are not publicly traded. Therefore we have selected a 'peer group' of publicly traded water distribution firms, as well as regulated energy network firms that have similar systematic risk to a regulated water distribution firm. We use the peer group of companies to estimate the beta and gearing for water distribution. We have tested that the shares of the peer group firms are sufficiently liquid to provide a reliable beta estimate.
10. The methodology specifies a three-year daily sampling period for the betas. We estimate that the asset beta for water distribution in the Netherlands is 0.39. This compares to an asset beta of 0.38 in the July 2019 report.
11. As we explain in this report, a very high level of investment over the next regulatory period may warrant an increase in the beta we apply when estimating the cost of capital for the Dutch water firms. We have analysed historical and expected evolution of the Dutch drinking water companies' capital expenditure and RAB, to determine if an adjustment to the beta of the Dutch drinking water companies is warranted. A beta uplift is only warranted in case of an extraordinary increase in the RAB. We estimate that over the period 2021-2029, the RAB of the Dutch Drinking water companies is expected to increase by an average rate of 4.0% a year. This compares to an average rate of 3.0% a year over the period 2014-2021. We conclude that although planned investments of the Dutch drinking water companies are expected to increase, the magnitude of the increase is not large.

Accordingly, the speed at which the RAB of the Dutch drinking water companies is expected to grow does not warrant an uplift to the beta.

D. Gearing

12. The ACM has asked us to evaluate a reasonable level of gearing (D/A) for the Dutch drinking water companies, also assessing whether this level is consistent with a single-A rating.

13. In line with the ACM general WACC methodology, and with the prescriptions of the applicable legislation, we calculate the gearing of the Dutch drinking water companies by reference to the median gearing of a group of European water distribution firms and European energy networks, bearing in mind the constraint to have at least 30% debt financing.[3] Overall, we find that the median gearing – defined as the ratio of debt to total asset value or D/A – for this group is equal to 47.15%.

14. To evaluate whether a 47.15% gearing is consistent with a single-A credit rating, we analyse the Dutch water companies' gearing and likely credit rating.

15. We calculate that the average actual gearing of the Dutch water companies is equal to 56.0%, and that with this gearing, a representative Dutch drinking water company would likely get a credit rating of A+. Hence, a Dutch water company with the average European gearing of 47.15% would qualify for a single-A rating.

E. Cost of Debt and Debt Premium

16. ACM's methodology specifies that the allowed cost of debt is set equal to the RFR for debt plus an average interest spread or debt premium.

17. The current methodology specifies that the debt premium should be based on the average cost of debt for generic A-rated industrial bonds, and the cost of debt for a group of bonds issued by firms engaged in similar activities to drinking water distribution companies that have a rating at or close to A – so-called 'comparable bonds'. We understand that 'similar activities' in this context includes, in addition to water distribution companies, transport and/or distribution of gas and electricity. We identified a group of comparable bonds that fit these criteria.

18. The ACM has informed us that the Ministry of Infrastructure and Water Management plans to amend the methodology for calculating the debt premium to consider only the comparable bonds.

19. We thus calculate a different debt premium for the WACC 2022-2023 and the WACC 2022-2024. To make the calculation consistent with the calculation of the risk-free rate, we consider the average between the two year and the five-year average spread for the WACC 2022-2023, and the 10-year average spread for the WACC 2022-2024:

[3] According to the decree on the permitted share of equity capital for 2020 and 2021, the maximum permitted share of equity capital of a drinking water company is set at 70%, which implies a minimum share of debt of 30%. See "Besluit vaststelling maximaal toegestane aandeel eigen vermogen, ex artikel 10, tweede lid, Drinkwaterwet, voor 2020 en 2021", available at: https://wetten.overheid.nl/BWBR0042716/2019-11-02.

a. For the WACC 2022-2023, we estimate a debt premium of 0.94% based on the average spread for the generic industry bonds and the comparable bonds, resulting in a pre-tax cost of debt of 1.03%, when we add a RFR of -0.06% plus 15 basis points to account for the cost of issuing debt.

b. For the WACC 2022-2024, we estimate a debt premium of 1.13% based on the average spread for the comparable bonds, resulting in a pre-tax cost of debt of 2.16%, when we add a RFR of 0.88% plus 15 basis points to account for the cost of issuing debt.

F. WACC of the Dutch Drinking Water Companies

20. Table 1 summarizes the two WACCs for drinking water distribution and the inputs to the WACC calculation.

TABLE 1: SUMMARY OF WACC CALCULATION

			WACC 2022-2023	WACC 2022-2024
Gearing (D/A)	[1]	Section VI	47.15%	47.15%
Gearing (D/E)	[2]	[1]/(1-[1])	89.22%	89.22%
Tax rate	[3]	Assumed	0.00%	0.00%
Risk free rate - Equity	[4]	Section II	-0.06%	-0.06%
Asset beta	[5]	Section V	0.39	0.39
Equity beta	[6]	[5]x(1+(1-[3])x[2])	0.74	0.74
Equity Risk Premium	[7]	Section III	5.00%	5.00%
After-tax cost of equity	[8]	[4]+[6]x[7]	3.65%	3.65%
Risk free rate - Debt	[9]	Section II	-0.06%	0.88%
Debt premium	[10]	Section VII	0.94%	1.13%
Non-interest fees	[11]	Assumed	0.15%	0.15%
Pre-tax cost of debt	[12]	[9]+[10]+[11]	1.03%	2.16%
Nominal after-tax WACC	[13]	((1-[1])x[8])+([1]x(1-[3])x[12])	2.41%	2.95%
Nominal pre-tax WACC	[14]	[13]/(1-[3])	2.41%	2.95%

II. The Risk-Free Rate

21. The relevant legislation for the drinking water sector specifies that a common RFR is used in the calculation of both the cost of equity and the cost of debt. Such RFR is set based on the two-year and five-year average yield on 10-year Dutch government bonds.

22. The ACM has informed us that due to expected changes in legislation, the methodology may be amended to calculate a separate RFR for cost of equity and cost of debt. The RFR for the cost of equity will be set using the current methodology. The RFR for the cost of debt will instead be set based on the ten-year average yield on 10-year Dutch government bonds.

23. Figure 1 below illustrates the yields on 10-year Dutch government bonds. Over the past 10 years, Dutch government bond yields have progressively dropped from over 3% in 2011 to about 0% in 2016, turning negative for the first time in July 2016. After that, yields fluctuated above zero until the end of 2018, when they started falling steadily, entering into negative territory around June of 2019. In response to the Covid-19 pandemic crisis, in March 2020 the ECB launched a €750 billion asset purchase programme through the Pandemic Emergency Purchase Programme (PEPP).[4] In March 2020, yields briefly dipped below minus 0.8%, but then increased again to pre-PEPP levels. This may be due to an increase in government default risk perceived by investors due to the pandemic. Since then, yields have gradually decreased over the course of 2020. In February 2021, yields started increasing again, averaging -0.14% in April 2021.

24. As shown in Figure 1, the two-year, five-year and 10-year averages of the 10-year Dutch government bond yields were, respectively, equal to -0.28%, 0.15%, and 0.88%.

    a. We use the average between the two-year and five-year average yield, equal to -0.06%, as a measure of the RFR for both the cost of equity and the cost of debt in the WACC 2022-2023 and for the cost of equity in the WACC 2022-2024;

    b. We use the 10-year average yield of 0.88% as a measure of the RFR for the cost of debt in the WACC 2022-2024.

[4] See European Central Bank Press Release, "ECB announces €750 billion Pandemic Emergency Purchase Programme (PEPP)", 18 March 2020 (available at: https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200318_1~3949d6f266.en.html).

FIGURE 1: YIELD ON DUTCH GOVERNMENT 10-YYEAR BONDS

Source: Bloomberg.

III. The Equity Risk Premium

25. ACM's methodology specifies that the ERP should be based on a historical time-series of the excess return of stocks over long-term bonds for the Eurozone economies. Specifically, ACM has determined to use the simple average of the long-term arithmetic and geometric ERP for the Eurozone as the anchor for the ERP estimate. The ERP for individual countries in the Eurozone should be weighted using the current capitalization of each country's stock market.[5] The methodology reflects an estimate of the ERP in the very long run, and notably excludes countries outside of the Eurozone. This is reasonable, because a Dutch investor is more likely to be diversified over the same currency zone, rather than to incur additional currency risks by diversifying within Europe but outside of the Eurozone.

26. Table 2, below, illustrates the realised ERP derived from one of the most widely used sources for long-run excess returns, being the data published by Dimson, Marsh and Staunton (DMS) for individual European countries taken from the February 2021 DMS report.[6] This report contains ERP estimates using data up to and including 2020. Table 2 shows the simple and weighted averages of the ERP for the Eurozone countries for which DMS have data. We find that the simple average between the arithmetic and geometric ERP for the period 1900 to 2020 inclusive was 5.38% for the Eurozone. Using each country's stock market capitalization to weight the averages across the Eurozone, we derive an ERP of 4.85%.[7] This value compares to a weighted average for the Eurozone of 4.95% in 2019.[8]

[5] Weighting based on the current market-capitalization reflects the idea that a typical investor would invest a larger share of his portfolio in countries with more investment opportunities.

[6] Credit Suisse Global Investment Returns Sourcebook 2021, Table 10.

[7] Note that the in calculating the Eurozone averages, at the request of ACM, we include Austria, for which DMS reports a value of the arithmetic mean of 20.6%. Excluding Austria would reduce the value weighted Eurozone average of the arithmetic mean from 6.31% to 5.98%, and the average between the value weighted arithmetic and geometric means from 4.85% to 4.66%.

[8] See Brattle 2019 Report, p. 5.

TABLE 2: HISTORIC EQUITY RISK PREMIUM RELATIVE TO BONDS (1900 – 2020)

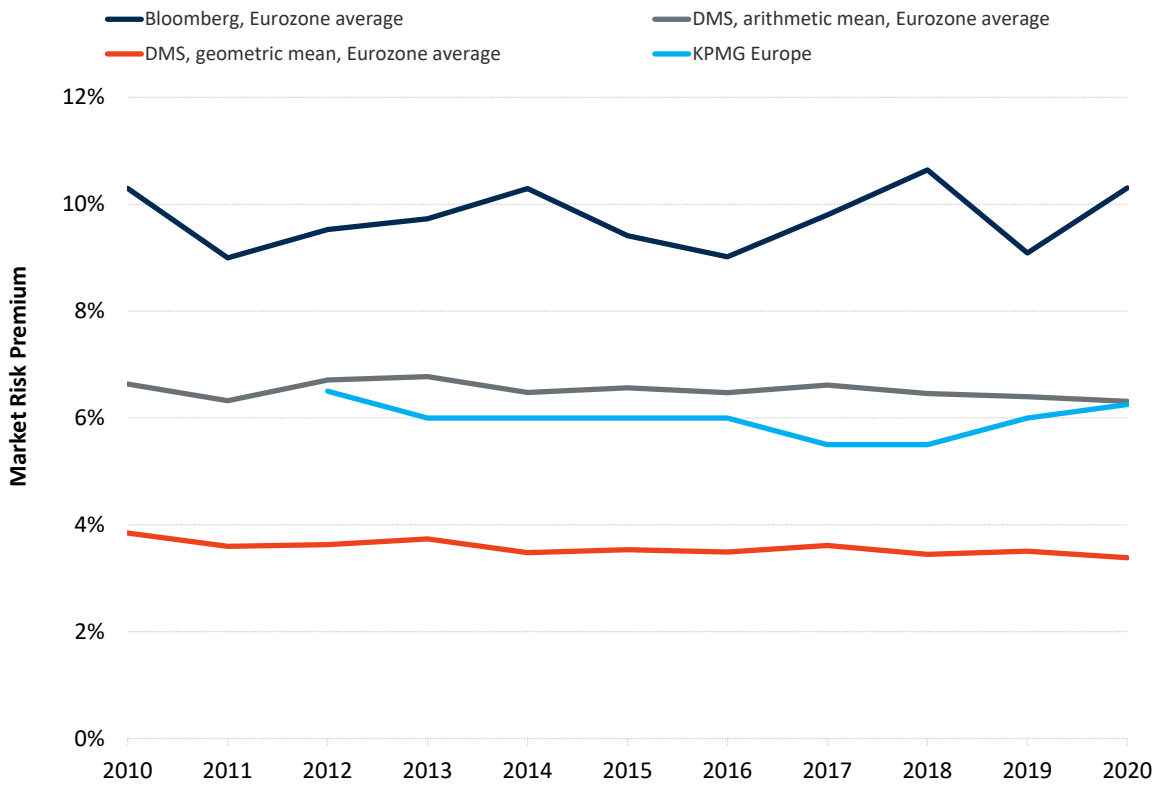
			Risk premiums related to bonds, 1900 - 2020			
		Eurozone	Geometric mean	Arithmetic mean	Average	Country Market Cap (2020)
			%	%	%	USD mln
			[A]	[B]	Average [A], [B]	[C]
Austria	[1]	1	2.50	20.60	11.55	141,110
Belgium	[2]	1	2.00	4.10	3.05	401,681
Denmark	[3]		3.30	5.00	4.15	660,621
Finland	[4]	1	5.20	8.80	7.00	329,770
France	[5]	1	2.90	5.20	4.05	2,942,643
Germany	[6]	1	4.80	8.10	6.45	2,492,464
Ireland	[7]	1	2.60	4.50	3.55	130,192
Italy	[8]	1	2.70	6.10	4.40	648,528
Norway	[9]		2.50	5.30	3.90	350,491
The Netherlands	[10]	1	3.20	5.40	4.30	975,517
Portugal	[11]	1	5.10	9.10	7.10	86,437
Spain	[12]	1	1.30	3.30	2.30	699,148
Sweden	[13]		3.20	5.40	4.30	1,131,313
Switzerland	[14]		2.20	3.70	2.95	2,036,444
United Kingdom	[15]		3.40	4.70	4.05	3,283,790
Average Eurozone	[16]		3.23	7.52	5.38	
Value-weighted average Eurozone	[17]		3.38	6.31	4.85	

Notes and sources:
[A][1]-[15], [B][1]-[15]: Credit Suisse Global Investment Returns Sourcebook 2021, Table 10.
[16]: Average [1], [2], [4], [5], [6], [7], [8], [10], [11], [12].
[17]: Average [1], [2], [4], [5], [6], [7], [8], [10], [11], [12], weighted by [C].

27. ACM's methodology considers whether an adjustment to an ERP estimate based on historical data is warranted, based on evidence from models such as the dividend growth model (DGM) that are based on dividend forecasts. In Figure 2, below, we compare the DMS estimates of the arithmetic and geometric means of the historical ERP for the Eurozone to the forward looking estimates of the ERP based on Bloomberg's and KPMG's DGMs.[9]

[9] KPMG provides a DGM-based estimate of the ERP for Europe based on the implied equity returns of European indices. See "Equity Market Risk Premium - Research Summary", KPMG, 31 December 2020. Bloomberg provides daily DGM-based estimates of the ERP for individual European countries under the 'Country Risk Premium' function. We use Bloomberg's DGM-based ERP estimates for individual Eurozone countries as of 31 December of each year to calculate a weighted average DGM-based ERP for the Eurozone.

FIGURE 2: EUROZONE EQUITY RISK PREMIUMS BY YEAR



Source: Bloomberg, various DMS reports, KPMG Netherlands and Brattle calculations. Markets included in the KPMG estimate are ASX, FTSE, Stoxx 600 and S&P 500.

28. As shown in Figure 2, KPMG's estimate of the ERP has remained relatively stable over the past few years, unchanged between 2017 and 2018 at 5.5%, and increasing to 6.00% in 2019 and to 6.25% in 2020. Bloomberg's DGM estimate of the ERP increased from 9.8% in 2017 to 10.6% in 2018, decreased to 9.09% in 2019 and increased to 10.31% in 2020. On the other hand, the average of the arithmetic and geometric means based on the historical DMS data decreased from 5.11% in 2017 to 4.95% in 2018, remained unchanged between 2018 and 2019, and decreased to 4.85% in 2020. However, the drop in the DMS historical ERP between 2017 and 2018 was primarily driven by a sharp drop in stock prices at the end of 2018.[10] Similarly, the drop in the DMS historical ERP between 2019 and 2020 seems odd, because in spite of a sharp drop at the beginning of the Covid pandemic, overall stock prices in European markets increased in the course of 2020. Hence, the apparent fall in the ERP seen in the last few years could be an anomaly. But the DGM evidence indicates that the ERP has if anything increased, as the increase in KPMG's and Bloomberg's DGM estimates in 2020 seem to suggest. Similar to after the financial crisis, therefore, the DGM estimates indicate that a downward reduction in the ERP, as suggested by the historical data, is not justified.

29. In Table 3, below, we report the average of the geometric and arithmetic average DMS ERP for the Eurozone weighted by stock market capitalisation for each of the years 2016-2020 inclusive. The average ERP over this five-year period was 4.97%. This is higher than the ERP of 4.85% indicated by the 2020 DMS data. Based on this evidence, we conclude that an ERP of 5.00% seems reasonable. This

[10] Overall, the stock market capitalization for the Eurozone economies fell by around 20% on average.

value is in line with the value of the ERP set by the ACM for the electricity and gas networks in its most recent method decisions.

TABLE 3: DMS ERP DATA 2016 - 2020

	Geometric mean [A] %	Arithmetic mean [B] %	Average [C] %
2016	3.49	6.47	4.98
2017	3.61	6.61	5.11
2018	3.45	6.46	4.95
2019	3.50	6.40	4.95
2020	3.38	6.31	4.85
Average	3.49	6.45	4.97

Notes:
Brattle calculations using data from Credit Suisse Global Investment Returns Sourcebook, 2015-2021.
[A], [B]: Value weighted average for the Eurozone.
[C]: Average [A], [B].

IV. Selection of Peers and Screening Tests

A. Potential Peers

30. The Dutch water distribution firms are not listed on a stock exchange. Therefore, to estimate the beta parameter, we need to find publicly traded firms with similar systematic risk to the Dutch water distribution firms. We can then estimate a beta value from these firms, which we call 'comparables' or 'peers'.

31. In determining the number of peers, there is a trade-off. On the one hand, adding more peers to the group reduces the statistical error in the estimate of the beta. On the other hand, as more peers are added, there is a risk that they may have a different systematic risk than the regulated drinking water firms, which makes the beta estimate less accurate. In statistical terms, once we have 6-7 peers in the group the reduction in the error from adding another firm is relatively small.

32. In this report we begin with the 12 companies selected as peers in 2019.[11] However, we exclude Connecticut Water SVC Inc and Societe des Eaux de Douai SA, because these two companies were delisted in October 2019 and May 2019, respectively. We check whether the remaining 10 companies still meet our criteria for inclusion, which we describe in the following sections of the report. We also reanalyse companies selected as potential peers but ultimately excluded in 2019, to see if these companies may now meet the criteria for inclusion. Table 4 provides a list of the potential peers considered.

[11] See Brattle 2019 Report, Table 9.

TABLE 4: FIRMS SELECTED AS POTENTIAL PEERS

Potential peers		Country	Considered in 2019	Selected in 2019
European Water Companies				
Severn Trent PLC	[1]	United Kingdom	✓	✓
Pennon Group PLC	[2]	United Kingdom	✓	✓
United Utilities Group PLC	[3]	United Kingdom	✓	✓
Athens Water Supply & Sewerage	[4]	Greece	✓	✓
Tallinna Vesi	[5]	Estonia	✓	×
Thessaloniki Water and Sewage Company SA	[6]	Greece	✓	×
Eaux de Royan SA	[7]	France	✓	×
US Water Companies				
California Water Service Group	[8]	United States	✓	✓
Essential Utilities	[9]	United States	✓	×
American Water Works Co Inc	[10]	United States	✓	✓
American States Water Co	[11]	United States	✓	×
Middlesex Water Co	[12]	United States	✓	✓
SJW Group	[13]	United States	✓	×
York Water Co	[14]	United States	✓	×
European Network Companies				
Snam	[15]	Italy	✓	✓
Terna Rete Elettrica Nazionale	[16]	Italy	✓	✓
REN - Redes Energeticas Nacionais	[17]	Portugal	✓	×
Red Electrica	[18]	Spain	✓	✓
Enagas	[19]	Spain	✓	✓
Elia Group SA/NV	[20]	Belgium	✓	✓
Fluxys Belgium	[21]	Belgium	✓	×

33. In the following sections, we describe how we test the potential peers for:

    a. Liquidity

    b. Minimum revenues from Regulated Activities

    c. No major Merger and Acquisition (M&A) activity over the estimation period

    d. Minimum credit rating

B. Liquidity Tests

34. Illiquid stocks tend to underestimate the true industry beta.[12] Hence, for each of the potential peers in the initial sample, we test to see if the firms' shares are sufficiently liquid.

[12] To understand why this is true, for example, consider a firm with a true beta of 1.0, so that the firm's true value moves exactly in line with the market. Now suppose that the firm's shares are traded only every other day. In this case, the firm's actual share price will only react to news the day after the market reacts. This will give the impression that the firm's value is not well correlated with the market, and the beta will appear to be less than one. Using weekly returns to calculate beta mitigates this problem, since it is more likely that the firm's shares will be traded in the week. However, using weekly returns have other disadvantages, such as providing 80% less data points over any given period.

35. Historically, the ACM methodology applied two criteria to test for liquidity. First, the shares of the candidate peers had to be traded on at least 90% of the days in which the relevant market index traded over the reference period (the number of trading days test). Second, the ACM methodology required that the candidate peers had annual revenues of at least € 100 million (the annual revenue requirement), on the basis that firms with larger revenues are likely to have shares that are liquidly traded.

36. More recently, in response to a court ruling,[13] the ACM commissioned a study to provide a recommendation on the appropriate criteria to select peers for efficient beta estimation. The study determined that the two existing criteria adopted by ACM should be modified, and that a bid-ask spread threshold of 1% should be applied instead as the primary liquidity criterion.[14] The ACM has asked us to follow this recommendation, and to perform additional liquidity tests as 'sanity checks' on the results. We find this to be a reasonable approach to test for liquidity.

37. We calculate the average bid-ask spread as a percentage of the stock price over the reference period 1 May 2018 -30 April 2021.[15] As illustrated in Figure 3, the 1% cut-off leads to the exclusion of Fluxys Belgium, Thessaloniki Water and Sewage, and Eaux de Royan.[16]

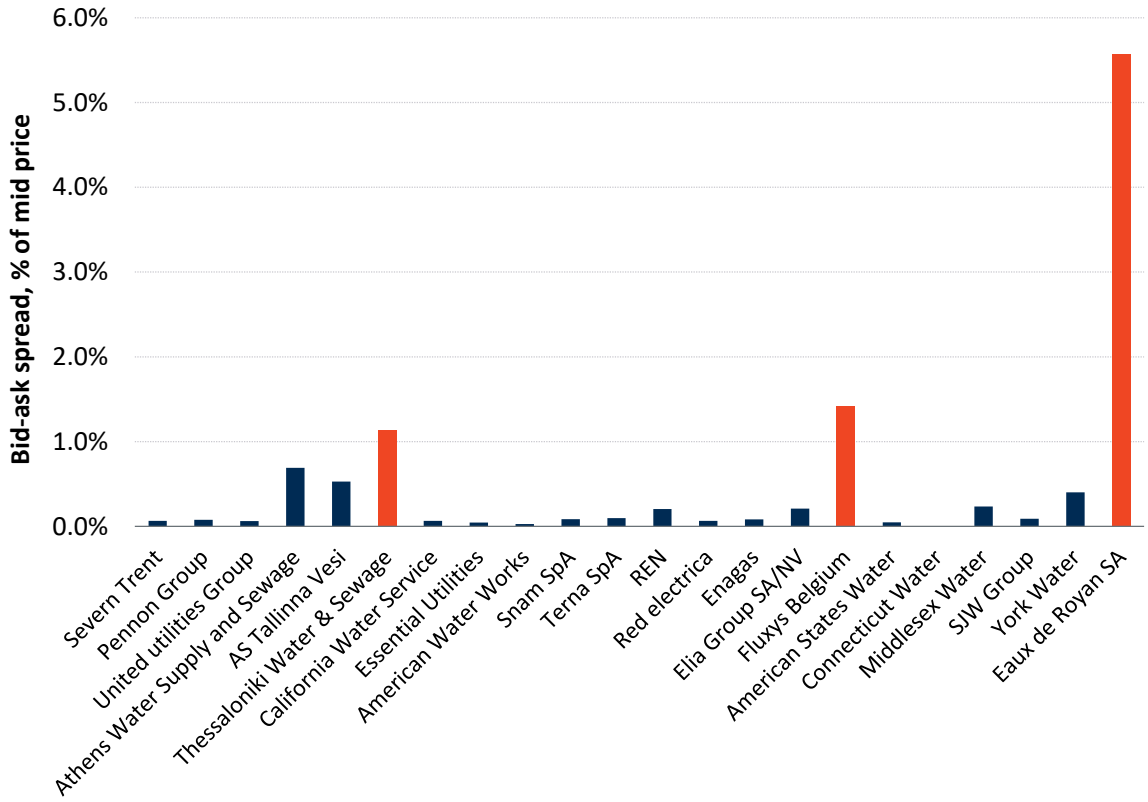
[13] The court ruling was directly related to the peer group of companies used to estimate the beta for the Dutch network companies. The court found that one of the peer companies, Fluxys, did satisfy both the number of trading days and annual revenue requirements. However, the court determined that a high value of the bid-ask spread demonstrated that Fluxys' shares were illiquid.

[14] Frontier Economics, "Criteria to select peers for efficient beta estimation. A report for the ACM", 8 January 2020.

[15] More specifically, we calculate the daily value of the bid-ask spread as the difference between bid price and ask price at closing divided by the average between the bid price and the ask price. We then calculate the simple average of the daily bid ask spreads over the relevant period.

[16] We acknowledge a trade-off in using a lower cut-off point, which would potentially lead to exclude companies otherwise considered as sufficiently liquid. A cut-off of 0.5% would only lead to the exclusion of Athens Water Supply and Sewage, because AS Tallina Vesi does not pass the revenue test.

FIGURE 3: BID-ASK SPREAD



Source: Brattle calculations on Bloomberg data.

38. We apply two further 'screens' related to liquidity as additional checks. First, we test that each firm's shares trade frequently, the idea being that more frequent trading will give a more reliable beta estimate. We define a share as being sufficiently traded if it trades on more than 90% of days in which the relevant market index trades over the three-year period 1 May 2018 through 30 April 2021.[17] Second, we check that the peer companies have annual revenues exceeding €100 million in each of the last three years. This is because companies with low revenue may also be relatively illiquid. We have applied these criterions in previous reports for the ACM.[18]

39. Table 5 summarises our results. Four companies were either traded on less than 90% of the trading days and/or reported annual revenues below 100 million over the period 2018-2020: Eaux de Royan, Thessaloniki Water, Tallinna Vesi and York Water. We already exclude Eaux de Royan and Thessaloniki Water for their high bid-ask spread. With respect to Tallinna Vesi, we note that the company had significantly lower revenues than the other European water companies in the sample. Additionally, Tallinna Vesi had one of the highest bid-ask spreads in the sample and its asset beta, 0.15, was substantially lower than all European water companies, whose asset beta ranged between 0.28 and 0.57. A low beta estimate is a typical indicator of illiquid trading, so that estimated beta for Tallinna

[17] Specifically we use the Euro Stoxx index for companies listed in countries in the Eurozone (Athens Water Supply & Sewerage, AS Tallinna Vesi, Thessaloniki Water & Sewage, Eaux de Royan, Snam, Terna, Red Electrica, Redes Energeticas Nacionais, Enagas, Elia System Operator and Fluxys), the FTSE All-Share index for companies listed in the UK (Severn Trent, Pennon Group, United Utilities Group), the S&P 500 index for companies listed in the US (Essential Utilities, California Water Service Group, American Water Works, American States Water, SJW Group, York Water and Middlesex Water).

[18] See footnote 1.

Vesi is probably not accurate. Accordingly, we exclude Tallinna Vesi from the final sample. Conversely, we do not exclude York Water from the sample. In spite of its lower revenues, York Water's asset beta (0.73) is at the high end of the asset betas observed for the US water companies.

TABLE 5: TRADING FREQUENCY AND ANNUAL REVENUES

		% of days company traded	Total Revenues		
			2018	2019	2020
European and UK Water Companies					
Severn Trent PLC	[1]	100.00%	1,985	2,082	n/a
Pennon Group PLC	[2]	100.00%	1,648	1,609	n/a
United Utilities Group PLC	[3]	100.00%	2,047	2,131	n/a
Athens Water Supply & Sewerage	[4]	96.62%	350	346	349
Tallinna Vesi	[5]	97.01%	63	63	52
Thessaloniki Water and Sewerage Company SA	[6]	95.32%	75	75	73
Eaux de Royan SA	[7]	42.99%	43	n/a	n/a
US Water Companies					
California Water Service Group	[8]	100.00%	591	638	695
Essential Utilities	[9]	100.00%	710	795	1,463
American Water Works Co Inc	[10]	100.00%	2,930	3,245	3,323
American States Water Co	[11]	100.00%	370	423	427
Middlesex Water Co	[12]	100.00%	117	120	124
SJW Group	[13]	100.00%	337	376	494
York Water Co	[14]	100.00%	41	46	47
European Network Companies					
Snam	[15]	98.57%	2,586	2,665	2,770
Terna Rete Elettrica Nazionale	[16]	98.57%	2,319	2,345	2,576
REN - Redes Energeticas Nacionais	[17]	99.61%	727	787	758
Red Electrica	[18]	99.61%	1,961	2,027	2,003
Enagas	[19]	99.61%	1,342	1,183	1,084
Elia Group SA/NV	[20]	99.61%	1,932	2,319	2,474
Fluxys Belgium	[21]	98.57%	503	531	561

Notes:
[1], [2], [3]: No data is available for 2020.
[7]: No public data is available for 2019 and 2020.

C. Regulated Revenues

40. The peer companies used to estimate beta should have similar a systematic risk to the Dutch drinking water firms, meaning that, if the value of the drinking water firms were observable, it would react to changes in market conditions in the same way as the value of the peer firms.

41. Because revenues for water production, transport and supply are regulated, they are less sensitive to changes in economic conditions than a firm operating in the free market. Ideally, the firms we select

as peers should earn most of their revenues from a mix of regulated production, network and supply activities which are similar to those of the drinking water firms. Accordingly, we only include in the peer group companies with at least 80% of revenues from regulated production, network or supply activities.

42. As shown in Table 6, all companies, with the exception of Eaux de Royan, report revenues from regulated activity separately. Regulated activities represent at least 80% of total revenues for all peers, with the exception of American States Water, for which regulated activities represent between 75% and 76% of total revenues. We therefore exclude American States Water.

TABLE 6: PERCENTAGE OF REGULATED REVENUES

		% of Regulated Revenues		
		2018	2019	2020
European and UK Water Companies				
Severn Trent PLC	[1]	90%	88%	n/a
Pennon Group PLC	[2]	97%	96%	n/a
United Utilities Group PLC	[3]	99%	99%	n/a
Athens Water Supply & Sewerage	[4]	92%	93%	n/a
Tallinna Vesi	[5]	84%	90%	89%
Thessaloniki Water and Sewerage Company SA	[6]	97%	97%	99%
Eaux de Royan SA	[7]	n/a	n/a	n/a
US Water Companies				
California Water Service Group	[8]	100%	100%	100%
Essential Utilities	[9]	100%	100%	99%
American Water Works Co Inc	[10]	86%	85%	86%
American States Water Co	[11]	75%	76%	75%
Middlesex Water Co	[12]	88%	91%	91%
SJW Group	[13]	97%	97%	97%
York Water Co	[14]	93%	93%	92%
European Network Companies				
Snam	[15]	96%	96%	92%
Terna Rete Elettrica Nazionale	[16]	86%	88%	83%
REN - Redes Energeticas Nacionais	[17]	95%	95%	95%
Red Electrica	[18]	89%	86%	83%
Enagas	[19]	81%	92%	94%
Elia Group SA/NV	[20]	99%	99%	99%
Fluxys Belgium	[21]	97%	97%	96%

Notes:
[1], [2], [3], [4], : No data is available for 2020.
[7]: No public data is available.

D. M&A Activity

43. Substantial M&A activity will tend to affect a firm's share price in a way that is unrelated to the systematic risk of the business. Hence, the observed beta for a firm with substantial M&A activity will tend to underestimate the true beta for a firm with the same business activity absent M&A activity. Accordingly, we exclude firms that have been involved in 'substantial' mergers and acquisitions (M&A) during the period for which data is used to calculate the beta.

44. We define a 'substantial' M&A activity as a transaction involving more than 30% of the average market capitalization of the firm in the thirty days preceding the transaction, and having a noticeable effect on the daily returns of the stock price. Based on our analysis of M&A activity, we exclude Essential Utilities from the sample.[19]

E. Credit Rating

45. Share prices of firms with lower credit ratings tend to be more reactive to company-specific news. This will lower the measured beta, in a way that may not be representative of the Dutch drinking water firms. To avoid this issue, we select as comparables firms with an investment grade credit rating.

46. Table 7 shows the credit rating of our potential peers, as assigned by the credit-rating agency Standard & Poor's (S&P). According to S&P's credit-rating scale, an investment grade rating is BBB- or higher.[20] S&P has assigned a credit rating to 15 of the firms selected and all of them have a rating of BBB or higher.

47. S&P does not report a credit rating for several of the firms included in our group of potential comparables. We consider that Pennon Group would be investment grade, as its license conditions require it to maintain financial metrics consistent with an investment grade credit rating.[21]

48. No rating is available for United Utilities Group, although its subsidiary United Utilities recently received from S&P a rating of BBB+ on its long term obligations.

49. There is also no credit rating for Athens Water Supply. This is likely because, since its listing on the Athens Exchange in 2000 and until 2013, the Company held only a relative small amount of short-term debt, which seemed to fund working capital. From 2014 onwards, the company did not arrange any bank debt, either long-term or short-term. Accordingly, a credit rating does not seem relevant for Athens Water Supply.

50. We do not investigate further the credit rating of Eaux de Royan, Fluxys, Tallinna Vesi and Thessaloniki Water as these firms do not pass our liquidity and revenue tests.

[19] In March 2020, Essential Utilities completed the acquisition of Peoples, a Pittsburgh-based natural gas utility, in a €3.7 billion transaction, representing over 50% of Essential Utilities' market capitalization at the time.

[20] S&P actually states that BBB is investment grade. Since S&P adds pluses and minuses to its credit ratings, we interpret a BBB- rating to be investment grade.

[21] For details of the requirement for British water firms to maintain an investment grade rating see Ofwat, Monitoring Financial Resilience, December 2020, p. 35.

TABLE 7: CREDIT RATING

		Rating S&P [A]
European Water Companies		
Severn Trent PLC	[1]	BBB
Pennon Group PLC	[2]	n/a
United Utilities Group PLC	[3]	n/a
Athens Water Supply & Sewerage	[4]	n/a
Tallinna Vesi	[5]	n/a
Thessaloniki Water and Sewage Company SA	[6]	n/a
Eaux de Royan SA	[7]	n/a
US Water Companies		
California Water Service Group	[8]	A+
Essential Utilities	[9]	A
American Water Works Co Inc	[10]	A
American States Water Co	[11]	A+
Middlesex Water Co	[12]	A
SJW Group	[13]	A-
York Water Co	[14]	A-
European Network Companies		
Snam	[15]	BBB+
Terna Rete Elettrica Nazionale	[16]	BBB+
REN - Redes Energeticas Nacionais	[17]	BBB
Red Electrica	[18]	A-
Enagas	[19]	BBB+
National Grid	[20]	BBB+
Elia Group SA/NV	[21]	BBB+
Fluxys Belgium	[22]	n/a

Notes and sources:
Extracted from Bloomberg as of 18 May 2021.

F. The Final Sample of Peers

51. In Table 8, below, we provide a summary of the results of the screening tests we applied to arrive at our final sample of peers.

TABLE 8: SCREENING TESTS SUMMARY

			B-A spread	% days traded	Revenues	M&A activity	Final sample
European Water Companies							
Severn Trent PLC	SVT LN Equity	UK	✓	✓	✓	✓	✓
Pennon Group PLC	PNN LN Equity	UK	✓	✓	✓	✓	✓
United Utilities Group PLC	UU/ LN Equity	UK	✓	✓	✓	✓	✓
Athens Water Supply & Sewerage	EYDAP GA Equity	GR	✓	✓	✓	✓	✓
Tallinna Vesi	TVEAT ET Equity	EE	✓	✓	×	✓	×
Thessaloniki Water and Sewerage Company SA	EYAPS GA Equity	GR	×	✓	✓	✓	×
Eaux de Royan SA	MLEDR FP Equity	FR	×	×	×	✓	×
US Water Companies							
California Water Service Group	CWT US Equity	US	✓	✓	✓	✓	✓
Essential Utilities	WTR US Equity	US	✓	✓	✓	×	×
American Water Works Co Inc	AWK US Equity	US	✓	✓	✓	✓	✓
American States Water Co	AWR US Equity	US	✓	✓	×	✓	×
Middlesex Water Co	MSEX US Equity	US	✓	✓	✓	✓	✓
SJW Group	SJW US Equity	US	✓	✓	✓	✓	✓
York Water Co	YORW US Equity	US	✓	✓	✓	✓	✓
European Network Companies							
Snam	SRG IM Equity	IT	✓	✓	✓	✓	✓
Terna Rete Elettrica Nazionale	TRN IM Equity	IT	✓	✓	✓	✓	✓
REN - Redes Energeticas Nacionais	RENE PL Equity	PT	✓	✓	✓	✓	✓
Red Electrica	REE SM Equity	ES	✓	✓	✓	✓	✓
Enagas	ENG SM Equity	ES	✓	✓	✓	✓	✓
Elia Group SA/NV	ELI BB Equity	BE	✓	✓	✓	✓	✓
Fluxys Belgium	FLUX BB Equity	BE	×	✓	✓	✓	×

V. Asset Beta

52. ACM's methodology specifies that the cost of equity will be estimated by applying the Capital Asset Pricing Model, which expresses the cost of equity for a business activity as the sum of a risk-free rate and a risk premium. The size of the risk premium depends on ERP and the systematic risk of the underlying asset, a parameter referred to as 'beta'.[22] Beta is commonly estimated as the covariance of a firm's equity value relative to the market as a whole.

53. As explained above, the Dutch water distribution firms are not listed. Accordingly, we estimate the systematic risk for Dutch water distribution using our peer group of firms which are publicly traded and derive the majority of their profits either from water distribution, or from a regulated network activity which appears to face similar systematic risk to water distribution.

A. Peer Group Equity Betas

54. ACM's methodology specifies a three year daily sampling period for the beta. Accordingly, we estimate equity betas for the peer group of firms by regressing the daily returns of individual stocks on market returns over the last three years.[23]

55. The relative risk of each peer, as summarised in its beta parameter, must be measured against an index representing the overall market. A hypothetical investor in a Dutch water firm would likely diversify its portfolio within a single currency zone so as to avoid exchange rate risk. Accordingly, to calculate market returns we use a broad Eurozone index for companies operating in the Eurozone. We use national indices for companies operating in the UK and the US. Using indices from the relevant country or currency zone avoids exchange rate movements depressing the betas, and should result in a higher beta estimate than if we estimated betas against an index derived in a different currency.[24]

56. We perform a series of diagnostic tests to assess if the beta estimates satisfy the standard conditions underlying ordinary least squares regression. We test for autocorrelation using the Breusch-Godfrey

[22] Further information on assumptions and theory underlying the CAPM can be found in most financial textbooks; see Brealey, Myers, Allen, *"Principles of Corporate Finance".*

[23] As mentioned above, we use the three-year period 1 May 2018 through 30 April 2021 as our estimation window for the beta of all firms on the peer group.

[24] For example, suppose we calculate the beta of a UK firm, whose shares are priced in Pounds sterling (GBP) and which earns most of its profits in GBP, against an index denominated in Euros. Large changes in GBP-EUR exchange rates would reduce the beta. This is because, in Euro terms, the depreciation of the Euro would cause the returns of the UK firm to increase, while the Euro-denominated index has not changed. This reduces the covariance between the returns on the index and the return on the UK firm, which results in a lower estimate of beta. From the perspective of a Eurozone investor, the lower beta represents the diversification benefits of investing in another currency. However, it would not be correct to then apply this beta for a Eurozone investor investing in a firm in the Eurozone, which does not have the same diversification benefit, or for a UK investor investing in a UK firm. Hence, there is an argument that it would be reasonable to use an index which is in the same currency as the listed shares of the firm.

test, but rely on the OLS estimate of the beta parameter even in the presence of autocorrelation.[25] We test for the presence of heteroscedasticity using the White's test and use White's-Huber robust standard errors.

57. In addition to the above diagnostic tools and adjustment procedures, the ACM has asked us to apply an adjustment for market imperfections. This adjustment requires us to use a weekly beta instead of the daily beta, if it appears that share prices react to news the day before or the day after the market index reacts. This could occur because of differences in market opening times and trading hours, or differences in the liquidity of the firm's shares relative to the average liquidity of the market. If such an effect is present, a beta estimated using daily returns on the firm's share and on the market index may be biased. Similarly, financial market frictions caused by information asymmetries, transaction costs, limit orders, and overreaction to news may also affect the way information is incorporated in the share price. In contrast, weekly betas are less sensitive to the speed at which share prices assimilate information, because they use returns over five trading days.

58. In practice, the adjustment for market imperfections is a modified version of the Dimson adjustment applied by the ACM in its previous decisions. The Dimson adjustment regresses a company's daily returns using the market index returns one day before and one day after as additional regressors. If the market is perfectly efficient, all information should be dealt with on the same day. The adjustment for market imperfections considers that if the lag or the lead coefficient are either significantly different from zero or jointly significantly different from zero, this suggests that information about the true beta may be lost by considering only the simple regression. This problem can be largely resolved using weekly data to estimate the equity beta.

59. We have performed this adjustment for the firms in our peer groups. The adjustment is significant for four firms out of the total sample. Hence for these firms we take the weekly beta.[26] For the remaining firms we take the daily beta. Table 9 shows our results.

[25] We test for autocorrelation up to three lags. Note that the OLS estimator of the beta is unbiased (not systematically too high or too low) and consistent (converges to the correct value) even in the presence of autocorrelation.

[26] The weekly beta was lower than the daily beta for three out of the four companies, and higher for the other. In particular: the weekly beta of SJW Group (0.81) compares to a daily beta of 0.96; the weekly beta of York Water (0.85) compares to a daily beta of 0.98; the weekly beta of Terna (0.63) compares to a daily beta of 0.69; the weekly beta of REN (0.53) compares to a daily beta of 0.44.

TABLE 9: EQUITY BETAS

	Results		
	Beta	Robust standard error	Beta chosen
	[A]	[B]	[C]
European Water Companies			
Severn Trent PLC	0.55	0.06	Daily
Pennon Group PLC	0.52	0.06	Daily
United Utilities Group PLC	0.58	0.06	Daily
Athens Water Supply & Sewerage	0.57	0.10	Daily
US Companies			
California Water Service Group	0.76	0.10	Daily
SJW Group	0.81	0.11	Weekly
American Water Works	0.71	0.07	Daily
York Water Co	0.85	0.13	Weekly
Middlesex Water Co	0.84	0.09	Daily
European Network Companies			
Snam	0.83	0.13	Daily
Terna Rete Elettrica Nazionale	0.63	0.10	Weekly
Red Electrica	0.46	0.10	Daily
REN - Redes Energeticas Nacionais	0.53	0.10	Weekly
Enagas	0.65	0.10	Daily
Elia Group SA/NV	0.58	0.10	Daily

B. Peer Group Asset Betas

60. As well as reflecting the systematic risk of the underlying business, equity betas also reflect the risk of debt or financial leverage. As debt is added to the company, the equity will become riskier as more cash from profits goes towards paying debt in each year before dividends can be distributed to equity. With more debt, increases or decreases in a firm's profit will have a larger effect on the value of equity. Hence if two firms engage in exactly the same activity, but one firm has more debt, that firm will have a higher equity beta than the firm with less debt.

61. To measure the relative risk of the underlying asset on a like-for-like basis it is necessary to 'unlever' the betas, imagining that the firm is funded entirely by equity. The resulting beta is referred to as an asset beta or an unlevered beta. To accomplish the un-levering, the methodology specifies the use of the Modigliani and Miller formula.[27]

62. Consistent with the three-year reference period used to estimate the beta, we calculate the gearing of each comparator as the three-year average of quarterly gearing ratios obtained dividing quarterly net debt over quarterly market capitalization.

63. Table 10 illustrates both the equity beta and the asset betas for each firm. Overall, the asset betas range between 0.23 (REN - Redes Energeticas Nacionais) and 0.73 (York Water).

[27] The specific construction of this equation was suggested by Hamada (1972) and has three underlying assumptions: A constant value of debt; a debt beta of zero; that the tax shield has the same risk as the debt.

TABLE 10: EQUITY AND ASSET BETAS

			Equity beta [A]	Gearing (D/E) [B]	Tax rate [C]	Asset beta [D]
European Water Companies						
Severn Trent PLC	United Kingdom		0.55	115.0%	19.0%	0.28
Pennon Group PLC	United Kingdom		0.52	84.0%	19.0%	0.31
United Utilities Group PLC	United Kingdom		0.58	134.3%	19.0%	0.28
Athens Water Supply & Sewerage	Greece		0.57	0.0%	27.0%	0.57
Median		[1]				0.30
US Companies						
California Water Service Group	United States		0.76	39.7%	27.0%	0.59
SJW Group	United States		0.81	45.4%	27.0%	0.61
American Water Works	United States		0.71	44.1%	27.0%	0.54
York Water Co	United States		0.85	22.6%	27.0%	0.73
Middlesex Water Co	United States		0.84	22.4%	27.0%	0.72
Median		[2]				0.61
European Network Companies						
Snam	Italy		0.83	85.4%	24.0%	0.50
Terna Rete Elettrica Nazionale	Italy		0.63	73.1%	24.0%	0.40
Red Electrica	Spain		0.46	64.6%	25.0%	0.31
REN - Redes Energeticas Nacionais	Portugal		0.53	164.4%	21.0%	0.23
Enagas	Spain		0.65	78.3%	25.0%	0.41
Elia Group SA/NV	Belgium		0.58	107.3%	29.0%	0.33
Median		[3]				0.37

Notes and sources:
[B]: Calculated from Bloomberg data. Average values from Q2 2018 to April 2021.
[C]: KPMG.
[D]: [A]/(1+(1-[C])x[B]).

C. Asset Beta for Dutch Water Distribution

64. Table 10 illustrates a range of asset betas. The median asset betas for European water companies is 0.30, the median asset betas for US water companies is 0.61, and the median asset betas for European network companies is 0.37. From this range, we must derive a single estimate for the asset beta for Dutch drinking water distribution.

65. There are several reasons to believe that the US water companies have structurally higher betas because of differences in regulation and the US water industry more generally. US firms have a price cap, rather than a revenue control. Firms with a price caps tend to have higher betas, because they face volume risk, which itself tends to be correlated to economic activity. In other words, a downturn in economic activity could cause a reduction in transported volumes, which in turn leads to reduced revenues and profits for the network. Hence price-cap regulation increases the correlation between the firm's share price and the market index, giving a higher beta. In the US, water firms change their tariff or rates when either the water company or its customers asks for the tariffs to be changed via a

'rate case'. Since rate cases are expensive and risky – in that tariffs could change in unpredictable ways – they tend to be only brought when a large change in the market has occurred. Accordingly, there is a qualitative case that the revenues for US water firms will tend to be more highly correlated with the market, since it is more likely that, for example, the water firms' customers will ask for lower rates when there is a decrease in economic activity. This does not occur in Europe, where tariff reviews or price controls take place at regular fixed intervals, independent of macroeconomic activity. We also understand that US water firms are engaged in a historically high level of capital expenditure. This will lead to increased 'operating leverage', which will again tend to increase betas, all else being equal. Therefore, we conclude that the betas for US water firms are likely to overestimate the true beta for a Dutch water distribution firm.

66. European network firms have similar regulation to Dutch water distribution firms, in that they are subject to a regulated revenue control. However, they are not water firms. We expect that water demand may be less sensitive to macroeconomic conditions than demand for electricity or gas. While a regulated firm may have a revenue guarantee, a fall in revenues may only be compensated in a later period, and the present value of the compensation may not be sufficient to offset completely the earlier fall in revenues. Hence, differences in the sensitivity of demand to macroeconomic conditions could affect a regulated firm's beta. To the extent that water demand may be less sensitive to macroeconomic conditions than demand for electricity or gas, the beta for European network firms may be structurally higher than the beta for a Dutch water distribution firm.

67. We conclude that the asset betas we estimate for both US water companies and European network firms may overestimate the true beta for a Dutch water distribution firm. On the other hand, we prefer to rely on a sample of at least 10 firms in calculating beta. Given this, we give more weight to the European water firms, and less weight to the US water firms and the European network firms when estimating the asset beta for Dutch water distribution. Specifically, we give the European water firms a 50% weight, and the US water firms and the European network firms a 25% weight each. Table 11 shows that this results in an asset beta of 0.39. The asset beta of 0.39 is higher than the median European water firms' asset beta of 0.30, and in our view is more likely to overestimate the true asset beta for Dutch water distribution than to underestimate it.

TABLE 11: ASSET BETA FOR DUTCH WATER DISTRIBUTION

	Median Beta [A]	Weight [B]
European Water Companies	0.30	50%
US Water Companies	0.61	25%
European Network Companies	0.37	25%
Weighted average	0.39	

Notes and sources:
[1] to [3]:
[A]: Table 10: Equity and Asset Betas.
[B]: Assumed.
[4][A]: [1][A]x[1][B]+[2][A]x[2][B]+[3][A]x[3][B].

68. We note that if we had simply taken the median of the European and US water firms, we would have obtained a similar but higher asset beta of 0.57. The median of the entire unweighted peer group is 0.41.

D. Planned Investments and the Risk Profile of the Dutch Drinking Water Companies

69. The ACM has further asked us to evaluate whether expected developments and required investments in the drinking water sector will affect the risk profile of the Dutch drinking water companies. Commitments to make large investments may have an effect on the cost of capital – and specifically the firm's beta – similar to that of debt or leverage.

70. When a firm commits to investments that are large relative to the existing assets, the firm's value is more sensitive to changes in market conditions.[28] Financial analysts refer to this issue with the notion of operating leverage. Firms with higher investment requirements – higher operating leverage – will have higher betas. Hence, increased investment requirements for the Dutch drinking water companies could potentially increase their asset beta, relative to historic asset betas.

71. The key factor to determining the effect on beta is not the absolute level of future investments, but their size relative to the current RAB. Accordingly, to determine whether and to what extent an adjustment to the beta of the Dutch drinking water companies is warranted, we have analysed the historical and expected evolution of the Dutch drinking water companies' capital expenditure and RAB.

72. The ACM has provided us with historical data on the RAB of the Dutch drinking water companies over the period 2014-2019, along with provisional data on expected capital expenditure and depreciation over the period 2020-2029. We estimate the evolution of the RAB over the period 2020-2029 by updating the 2019 RAB to account for (i) planned investments and (ii) depreciation.

73. In Table 12, below, we compare the evolution of the RAB over the period 2014-2021 with the expected evolution over the period 2021-2029. Overall, we estimate that over the period 2014-2021, the RAB of the Dutch Drinking water companies has increased by 34% on average, corresponding to an average annual compound growth rate (CAGR) of about 3.0%. Over the period 2021-2029, the RAB of the Dutch Drinking water companies is expected to increase by 48% on average corresponding to an average CAGR of about 4.0%.

[28] To understand why, suppose that two regulated firms, A and B, both have a market value of 100 today, based on their current assets or RAB. Further, assume that the two firms face the same systematic risk on the assets, which may result in a gain or loss of 10% of market value. Hence, the value will vary between 90 and 110. Now suppose that firm B plans to increase its assets by 100. Because the new investments will be remunerated at the firm's cost of capital, the expected value of firm B is also equal to 100. This is because the firm will create additional assets with a value of 100, but needs to spend 100 to create these assets. However, assuming that the investment on the new assets has the same systematic risk of the existing assets, the expected value of the new assets will also vary by plus or minus 10%. That is, the present value of the new assets could be 110, but it could be 90. Thus, the net value of the new assets varies from -10 (in the case that the assets cost 100, but have a value of only 90) and +10 (in the case that the assets cost 100, but have a value of 110). Hence, the value of Firm B now varies between 80 (being 90 for the existing assets and -10 from the new assets) and 120 (being 110 from the existing assets and +10 from the new assets). This is variation of ±20%. The value of firm A, which has no new investments planned, varies from 90 to 110, or ±10%. Hence, the higher investment commitment of firm B increases the volatility of the firm's value.

TABLE 12: HISTORICAL AND EXPECTED EVOLUTION OF THE RAB FOR THE DUTCH DRINKING WATER COMPANIES

	2014-2021		2021-2029	
	Expected change [A]	CAGR [B]	Expected change [C]	CAGR [D]
Water Companies				
Brabant Water	39.24%	4.84%	28.78%	3.21%
Dunea	25.73%	3.33%	56.13%	5.73%
Evides	35.18%	4.40%	43.48%	4.62%
Oasen	50.96%	6.06%	63.51%	6.34%
PWN				
Vitens	12.96%	1.76%	35.55%	3.88%
Waternet	27.08%	3.48%	64.74%	6.44%
WBG	62.83%	7.21%	45.52%	4.80%
WMD	47.69%	5.73%	74.86%	7.23%
WML	4.72%	0.66%	22.38%	2.56%
Average	34.05%	**2.97%**	48.33%	**4.02%**

Sources and notes:
Data provided by ACM.

74. The evidence above indicates that planned investments of the Dutch drinking water companies are expected to increase. The magnitude of the increase, however, is not large, and the speed at which the RAB of the Dutch drinking water companies is expected to grow does not warrant an uplift to the beta. In the report on the WACC for the Dutch Electricity TSO and Electricity and Gas DSOs,[29] for example, we explained that a beta uplift is only warranted in case of an extraordinary increase in the RAB. In that report, we determined that TenneT's offshore transmission business met this criterion, with an expected annual RAB increase of 55.0% over the period 2019-2024. In contrast, we determined that annual RAB increases between 5% and 10% a year were not out of the ordinary, and required no adjustment to the beta.

[29] See Dan Harris and Lucrezio Figurelli, "The WACC for the Dutch Electricity TSO and Electricity and Gas DSOs", 7 April 2021.

VI.Gearing

75. The ACM has asked us to evaluate a reasonable level of gearing (D/D+E) for the Dutch drinking water companies, also assessing whether this level is consistent with a single-A rating.

76. The relevant decree states that the financing structure used for calculating the WACC should be that which is considered reasonable for drinking water companies given the situation on the financial markets. The explanatory notes to the decree also state that this value may deviate from the actual equity capital of the Dutch drinking water companies. We also understand that there is a requirement that Dutch water distribution firms are financed by no more than 70% equity, so in other words that they have at least 30% debt. This places a minimum or floor on the gearing for Dutch water distribution firms.

77. In line with the ACM general WACC methodology and with the prescriptions of the applicable legislation, we calculate the gearing of the Dutch drinking water companies by reference to the median gearing of the peer group of European water distribution firms and European energy networks, bearing in mind the constraint to have at least 30% debt financing. Relative to the calculation of beta, we exclude US water companies from the peer group for selecting the gearing. As mentioned above, the are significant differences in regulation between European and US water companies, and these differences are likely to affect the efficient level of gearing.

78. We do not limit the sample to companies with an A-rating. This is reasonable, because many factors may affect the taking of water utilities in addition to gearing. For example, to get an A rating absent public ownership, and in a country with a lower sovereign credit rating than the Netherlands, a water company would need a much lower level of debt than a publically owned water company in the Netherlands. Hence, Dutch water companies can sustain a higher level of debt and maintain an A rating than privately-owned water companies in other countries. In other words, there is no good reason to assume that A-rated companies with different ownership in other countries provide a good guide for the efficient level of gearing for a Dutch water company.

79. Consistent with the three-year reference period used to estimate the beta, we calculate the gearing (D/E) of each comparator as the three-year average of quarterly gearing ratios obtained dividing quarterly net debt over quarterly market capitalization.

80. In Table 13, below, we report the gearing (D/A) for the peer group of European water companies and European Network companies. Overall, the gearing (D/A) of European water companies range between 0% (Athens Water) and 55.5% (United Utilities). The gearing (D/A) of European network companies range between 42.3% (Terna) and 63.6% (REN). The median gearing for the entire group is equal to 47.15%.

TABLE 13: GEARING FOR LISTED EUROPEAN PEERS

	Country	Rating	D/A, Net
European Water Companies			
Severn Trent PLC	United Kingdom	BBB	53.22%
Pennon Group PLC	United Kingdom	n/a	42.52%
United Utilities Group PLC	United Kingdom	n/a	55.45%
Athens Water Supply & Sewerage	Greece	n/a	0.00%
European Network Companies			
Snam	Italy	BBB+	46.53%
Terna Rete Elettrica Nazionale	Italy	BBB+	42.34%
Red Electrica	Spain	A-	45.48%
REN - Redes Energeticas Nacionais	Portugal	BBB	63.56%
Enagas	Spain	BBB+	47.77%
Elia Group SA/NV	Belgium	BBB+	49.97%
Average			**44.68%**
Median			**47.15%**

81. We next evaluate whether a 47.15% gearing is reasonable for the Dutch drinking water companies and whether it would also be consistent with a single-A credit rating.

82. To estimate the likely credit rating that the Dutch drinking water companies would get based on their actual gearing and their current financial position, we have applied Moody's rating methodology for regulated water utilities. In order to do so, we have used information from the Dutch water companies' annual accounts,[30] and from Moody's credit rating decisions for TenneT and other rated energy networks in the Netherlands.[31]

83. In Table 14, below, we report the actual gearing (D/A) and likely rating of the Dutch drinking water companies based on Moody's rating methodology for regulated water utilities. The table reports both a baseline credit rating (column [C]), and a rating including a two-notch uplift to account for the public ownership and the strategic importance of the regulated business (column [D]). As we further explain in Appendix A, in rating regulated water utilities Moody's considers may apply an **uplift to the baseline rating** up to three notches for issuers that benefit from structural enhancements in their corporate structure, their regulatory licence or their financing arrangements. We believe that applying a two-notch uplift to the baseline rating of the Dutch drinking water companies is reasonable. Dutch Energy Networks benefit from the stability of the Dutch regulatory framework and from the higher rating of the Dutch government debt (AAA). In rating the Dutch energy networks Gasunie and TenneT, for example, the rating agency Moody's applies two-notch uplift to the networks' baseline ratings to

[30] We could not retrieve the annual accounts of Waternet and WND.

[31] See Moody's Investor Services, "Rating Methodology: Regulated Water Utilities", June 2018. See also, See Moody's Investor Services, "N.V. Nederlandse Gasunie: Update following the publication of Draft Method Decisions", November 2020; Moody's Investor Services, "TenneT Holding B.V.: Update following 2019 results", May 2020; Moody's Investor Services, "Alliander N.V.: Update to credit analysis", December 2020; and Moody's Investor Services, "Enexis Holding N.V.: Update to credit analysis", April 2020.

account for the Dutch government's ownership interest and the strategic importance of the business to national energy policy in the Netherlands. Similarly, Moody's has applied two-notch uplifts also to the baseline ratings of the Dutch DSOs Alliander and Enexis, reflecting a strong probability of support from their public owners, the importance of the networks' operations for the regional economy, and the strong governance framework in the Netherlands with oversight by the national government.

84. As shown in Table 14, we calculate that the actual gearing of the Dutch water companies ranges between 35.8% (Brabant Waters) and 70.1% (Vitens), for an average gearing (D/A) of 56.0%. By applying Moody's rating methodology, we find that all Dutch water companies, based on their actual gearing and current financial position, would likely get a rating equal or above A- when including a two-notch uplift on their baseline rating. Table 14 (row [11]) further reports the likely rating for a representative Dutch drinking water company, which was calculated based on the average gearing and financial position for the group. Overall, we find that a representative water company operating in the Netherlands would likely get a baseline credit rating of A-, which increases to A+ when we apply the two-notch uplift. We detail our analysis of the credit rating of the Dutch water companies in Appendix A.

TABLE 14: ACTUAL GEARING AND LIKELY RATING OF THE DUTCH DRINKING WATER COMPANIES

		D/A, Net [A]	Overall Score [B]	Baseline Rating [C]	Rating with uplift [D]
Dutch Water Companies					
Brabant Water	[1]	35.8%	6.29	A	AA-
Dunea	[2]	60.4%	7.56	BBB+	A
Evides	[3]	42.1%	5.95	A	AA-
Oasen	[4]	57.9%	7.89	BBB+	A
PWN	[5]	64.8%	7.89	BBB+	A
Vitens	[6]	70.1%	9.17	BBB	A-
Waternet	[7]	n.a.	n.a.	n.a.	n.a.
WBG	[8]	54.4%	7.28	A-	A+
WMD	[9]	n.a.	n.a.	n.a.	n.a.
WML	[10]	62.5%	8.70	BBB	A-
Mean	**[11]**	**56.0%**	**7.35**	**A-**	**A+**

[A]: Appendix A, Table 17.
[B]-[D]: Appendix A, Table 18 through Table 26.

85. Our analysis indicates that the Dutch water companies are able to get a single-A rating with a gearing of 56.0%. This level of gearing is higher than the assumed gearing of 47.15%. Accordingly, we conclude that a 47.15% would also be consistent with a single-A rating.

86. Determining the gearing based on a sample of European network firms is more likely to yield an efficient level of gearing than using the actual gearing of the Dutch water companies. If the ACM's WACC decision was based on the Dutch water companies actual gearing, in effect the companies would be able to pass through an inefficient capital structure to Dutch consumers. Looking at the gearing of other water companies and utilities is a reasonable way to determine the efficient capital structure for water distribution. In any case, at a 62% gearing a publicly owned Dutch water would still have an A rating.

87. Finally, we note that the final WACC results are not sensitive to the choice of gearing, as long as the firms maintain an A credit rating. As gearing increases, the proportion of relatively cheap debt in the

WACC formula increases. However, increased debt means more risk for equity holders, which results in a higher equity beta and a higher cost of equity. The cost of debt will also start to increase. These two effects – more relatively cheap debt versus increasing equity and eventually debt costs – largely offset one another.[32] For example, we estimate that the WACC 2022-2023 and the WACC 2022-2024 would increase by only 0.10 and 0.17 percentage points, respectively, as the gearing increases from 47.15% to 56.0%. As long as the target level of debt and the credit rating assumed are consistent with one another, and the credit rating is reasonable given that the country in which the firms operate, then the resulting WACC should be reasonable.

88. Given the observed gearing for European water and network companies, the need to maintain an A credit rating and the relative insensitivity of the WACC to the final choice of gearing (as long as it consistent with an A rating), a gearing (D/A) level of 47.15% is reasonable and likely to reflect an efficient level of gearing for regulated water firms operating in the Netherlands.

[32] The insensitivity of the WACC to the financing choices under certain assumptions is known as the Modigliani–Miller theorem.

VII. Cost of Debt

89. ACM's methodology for the drinking water sector specifies that the allowed cost of debt is set equal to the RFR plus an average interest spread or debt premium.

90. In section II we explained that in the calculation of the WACC 2022-2023 the ACM would apply a common RFR to the cost of equity and cost of debt, based on the two-year and five-year average yield on 10-year Dutch government bonds. In contrast, in the calculation of the WACC 2022-2024, the ACM would apply a different RFR on the cost of debt based on the 10-year average yield on 10-year Dutch government bonds.

91. With respect to the debt premium, the current methodology prescribes to consider two different sources of debt yields and spreads:[33]

    a. Yields and spreads on A-rated Euro bonds with a maturity of 10 years, where the bonds have been issued by firms active in the industry sector. We refer to these yields and spreads as 'generic industry';[34]

    b. Yields and spreads on bond issued by firms that engage in activities which are comparable to that of drinking water companies and which have a rating of A, A+ or A- and a maturity of around 10-years. In our view 'activities which are comparable to that of drinking water companies' in this context means not only firms engaged in drinking water distribution but also firms engaged in activities such as the transport and/or distribution of gas and electricity. We refer to these as the 'comparable' bonds.

92. The ACM has informed us that the Ministry of Infrastructure and Water Management plans to amend the methodology for calculating the debt premium to consider only the comparable bonds.

93. We thus calculate a different debt premium for the WACC 2022-2023 and the WACC 2022-2024. To make the calculation of the debt premium consistent with the calculation of the RFR, we consider the average between the two year and the five-year average spread for the WACC 2022-2023, and the 10-year average spread for the WACC 2022-2024.

94. We describe our analysis below.

A. Spread on the Generic Industry Bonds

95. The current methodology requires the calculation of the spread of the cost of 10-year debt over the RFR. We take the RFR to be the contemporaneous yield on a Dutch government 10-year bond. The spread is the difference between the yield on the generic A-rated industrial Euro-denominated debt

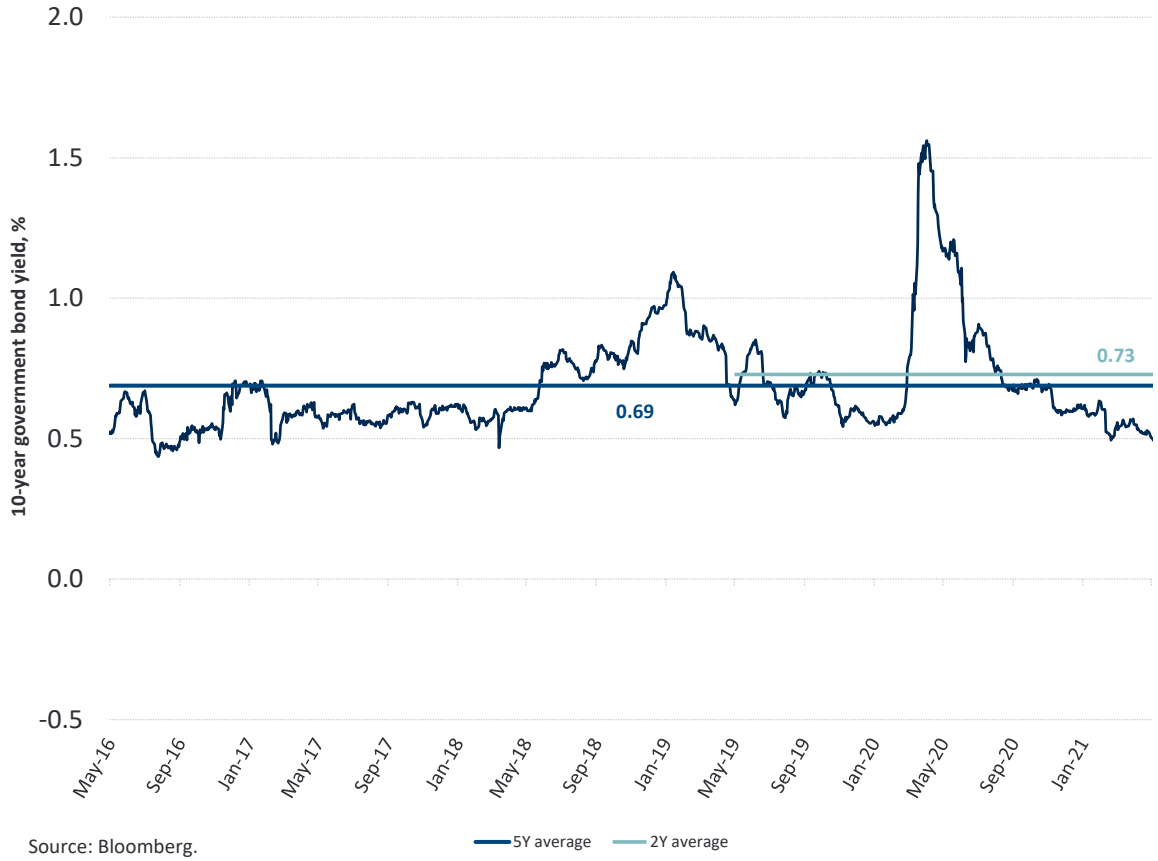
[33] By spread we mean the difference between the yield to maturity and the risk-free rate.

[34] By 'generic', we mean these are yields for a group of A-rated industrial firms calculated by Bloomberg, where the individual firms used in the sample have not been identified.

with 10 years maturity (C46510Y Index) and the contemporaneous yield on a Dutch government 10-year bond.

96. Figure 4 illustrates the evolution of the spread over the past five years. The Figure further reports the two-year and five-year averages. The average spread was 0.73% over the last two years and 0.69% over the last five years. The average of these two numbers gives a spread of 0.71%.

FIGURE 4: SPREAD OF 10-YEAR A-RATED EUROPEAN INDUSTRIAL DEBT OVER 10-YEAR DUTCH GOVERNMENT BONDS



Source: Bloomberg.

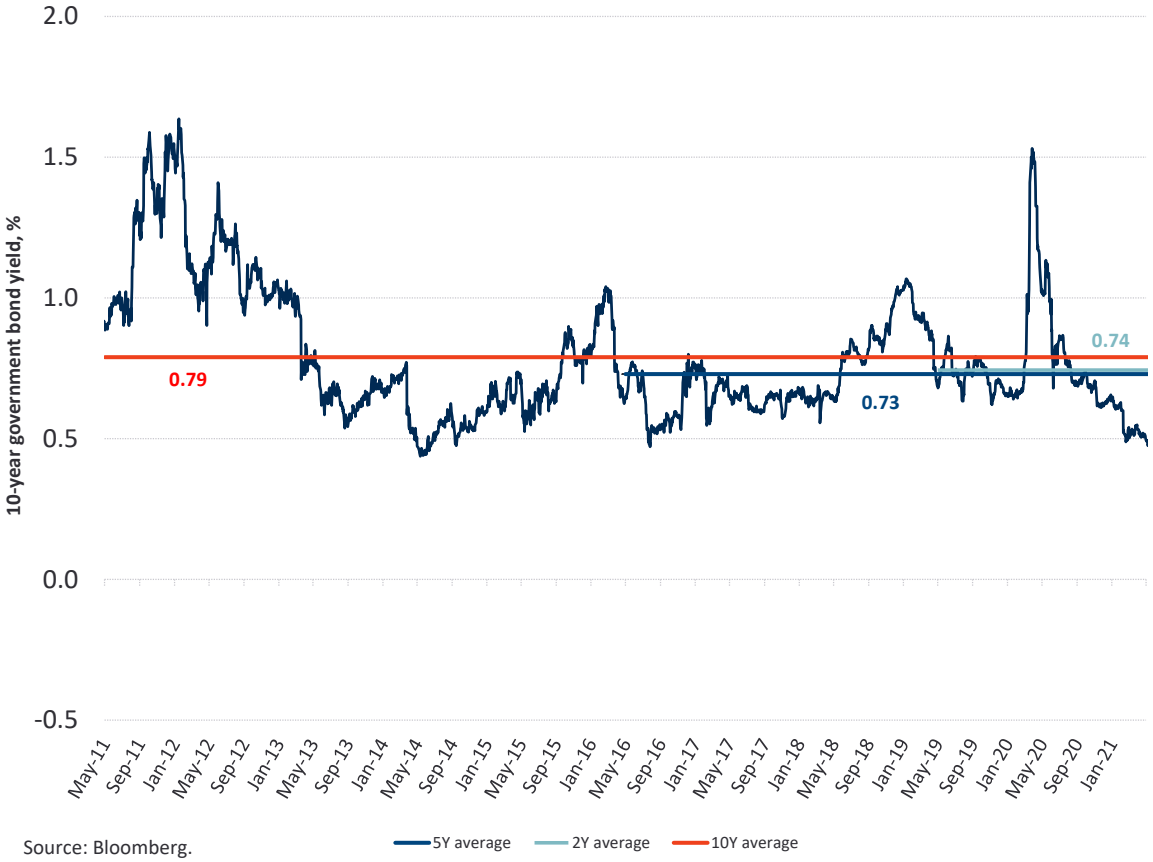
B. Spread on the Comparable Bonds

97. We consider two sources of 'comparable' bonds: a generic utility bond and individual bonds issued by firms engaged in similar activities to drinking water distribution.

1. Generic Utility

98. We take the difference between the yield on the generic A-rated utility Euro-denominated debt (C58310Y Index) with 10 years maturity and the contemporaneous yield on a Dutch government 10-year bond. The average spread for the generic A-rated EUR utility bonds was 0.74% over the last two years and 0.73% over the last five years. The average of these two numbers gives a spread of 0.74%. The average spread for the generic A-rated EUR utility bonds was 0.79% over the last ten years.

FIGURE 5: SPREAD OF THE GENERIC A-RATED UTILITY DEBT OVER 10-YEAR DUTCH GOVERNMENT BONDS



Source: Bloomberg.

2. Firms Engaged in Similar Activities to Drinking Water Distribution

99. We identified a 'long-list' of issuers whose bonds are traded and who seemed to be engaged in similar activities to drinking water distribution. This includes water distribution companies, but also network companies more generally. To increase the sample size we considered firms from around the world, and not only Europe, though we limited the currencies to GB Pounds Sterling, US Dollars, Canadian Dollars and Euros. We then screened the long-list to find debt which was rated either A, A+ or A- by Standard & Poors (S&P), and had a maturity of between 9 to 11 years during the 10-year period 1 May 2011 to 30 April 2021. We also eliminated so-called 'callable bonds',[35] 'putable bonds',[36] 'convertible

[35] Callable bonds can be redeemed by the issuer prior to maturity and generally attract a higher yield than bonds that mature on a fixed date. Callable bonds cannot be compared on a like-for-like basis with Government bonds that have a fixed maturity, which is why we do not use them in our analysis. Callable bonds generally attract a higher yield because bonds are more valuable if interest rates fall, but in this scenario the callable bond may be re-deemed. Hence the bond holder has an asymmetric pay-off.

[36] Putable bond gives bond holders options to sell back bonds to issuers at one or several specific dates before maturity. When interest rate arises, investors could exercise such option and use the proceeds in higher-yield investments. Bond holders are generally willing to accept a lower yield to have such option.

bonds'[37] and 'sinkable bonds'.[38] Applying these criteria reduced the number of possible bonds to 591 from 108 issuers. We then check that the firms were engaged in activities that could be considered similar to drinking water distribution. Specifically, we checked that most of the firms' revenues were derived from regulated activities in the energy or water sectors. Applying this criterion reduces the number of bond issuers to 26 firms, and the number of bond issues to 65 bonds. Appendix B gives details of the firms considered.

100. We only consider yields during the period when bonds have a 9 to 11 years maturity and calculate daily spreads against the yields of relevant government bonds with 10-year maturity. We select the relevant government bonds based on the country where the issuer predominantly operates. For example, for a bond issued by Elia we use a Belgian government bond.

101. For each bond, we compute the average daily spread over the relevant two-year, five-year and 10-year period.[39] We then compute two-year, five-year and 10-year average spreads as the simple average of the average daily spreads of the comparable bonds that had a 9 to 11 years maturity over the relevant period.

102. We find that:

    a. The two-year and five-year average spreads for comparable bonds are respectively 1.21% and 1.13%. The average between these two numbers gives us an average spread of 1.17%.

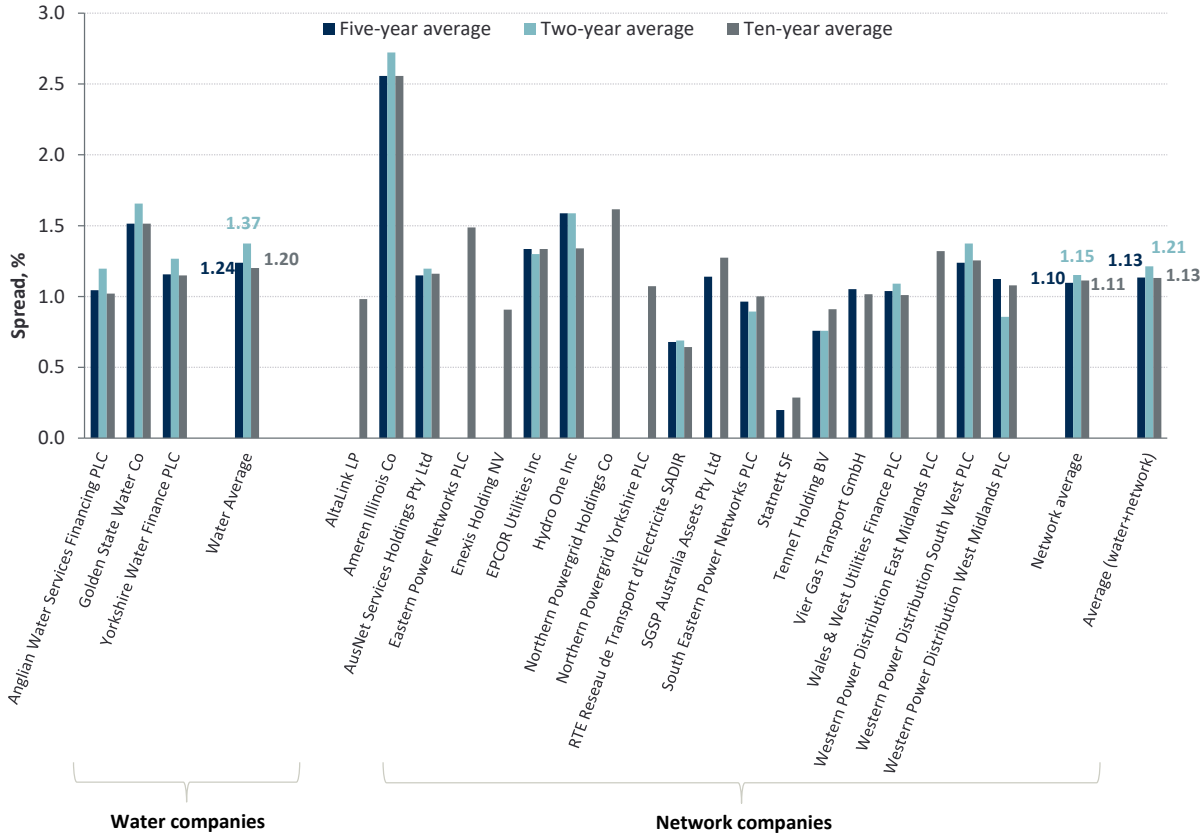
    b. The 10-year average spread for comparable bonds is 1.13%.

[37] Convertible bond is a type of bond that can be converted into equity at certain dates during its life. Convertible bond usually attracts a lower yield because investors could convert it into stocks and receive a higher yield when stock price arises.

[38] Sinkable bond is a bond issue backed by sinking fund, which sets aside money on a regular basis to ensure the repayments will be made. Sinkable bond has less risk to investors and allows the issuers to offer a lower interest rate to bond holders.

[39] Note that because we consider only bonds with a maturity of 9 to 11 years, for each bond we only calculate daily spreads over a two-year period. Depending on when the relevant bond had a 9 to 11 year maturity, its daily spreads will be used to calculate the two-year, five-year or 10-year averages. For example, the £ 25 million bond issue by Eastern Power Networks maturing on 7 October 2025 has only been considered over the period 7 October 2014-7 October 2016. This period is outside the window we use to compute the two year average spread –1 May 2019-30 April 2021. Accordingly, we do not consider this bond in calculating the two-year average. Conversely, this period partially overlaps with the five-year averaging period (1 May 2016-30 April 2021), and falls entirely within the 10-year averaging period (1 May 2011-30 April 2021). Accordingly, we take the average daily spread over the period 1 May 2016-7 October 2016 to calculate the five-year average spread, and the period 7 October 2014-7 October 2016 to calculate the 10-year average spread. See Appendix B.

FIGURE 6: SPREAD OF A-RATED PEERS OVER RELEVANT GOVERNMENT BONDS



C. Conclusions on Debt Spreads

103. Table 15 summarises the debt spreads for the Generic Industry bonds, the Generic Utility bonds and the individual comparable bonds. Table 15 shows that the individual comparable bonds have the highest spreads, followed by the Generic Utility bonds and then the Generic Industry bonds.

TABLE 15: THE AVERAGE SPREADS ON THE GENERIC INDUSTRY AND COMPARABLE BONDS

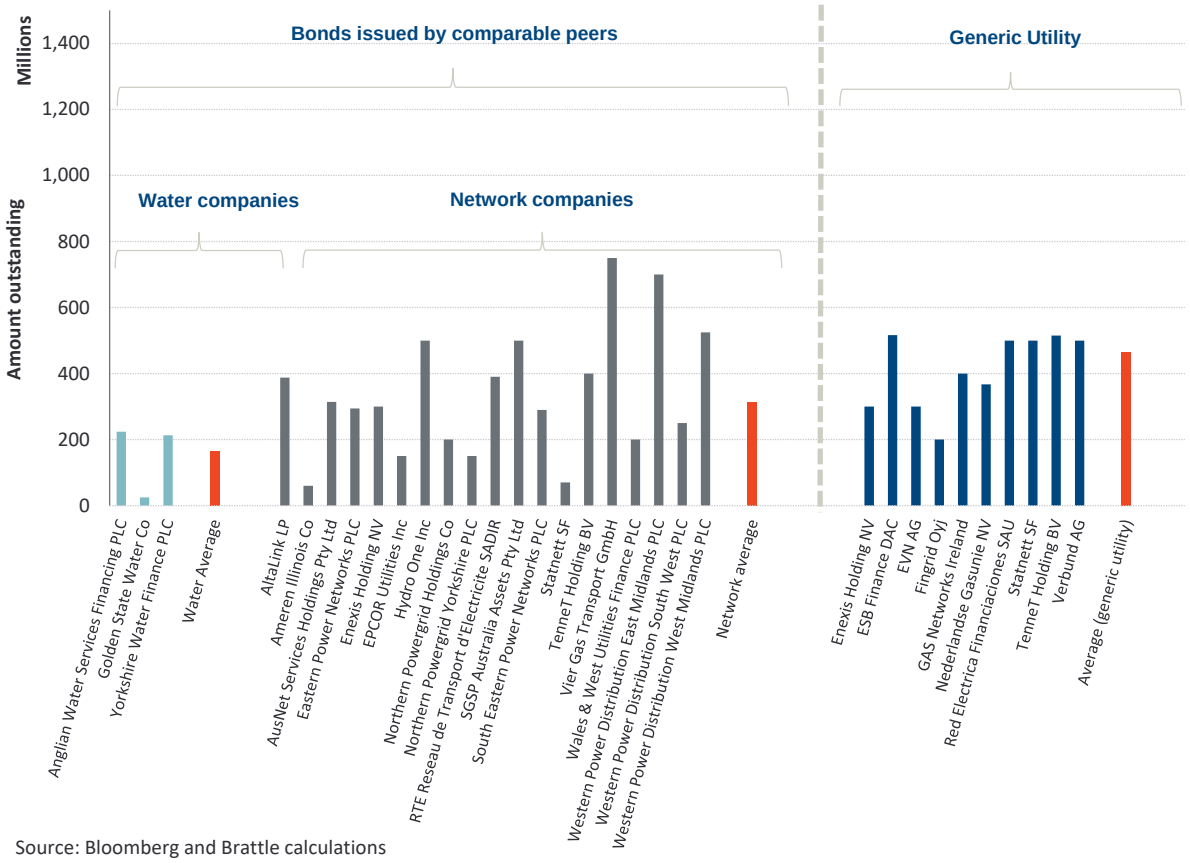
		Spreads		
			Comparables*	
		Generic industry	Utility index	Individual bonds*
Five-year average	[1] See note	0.69%	0.73%	1.13%
Two-year average	[2] See note	0.73%	0.74%	1.21%
Average	[3] Average [1], [2]	0.71%	0.74%	1.17%
Ten-year average	[4] See note		0.79%	1.13%

*Comparable bonds include A-rated bonds of 9-11 years maturity issued by network and water companies in EUR, GBP, USD, or CAD. We exclude from the sample bonds with lower average yields than local government bonds, as these imply a negative spread over the risk free rate.

104. It is possible that a significant part of the difference between the spread on the Generic Utility bonds and on the individual comparable bonds is due to illiquidity. Investors generally demand a higher return for bonds that are less frequently traded and are therefore less liquid. This is known as a liquidity premium. To confirm whether the difference is indeed due to a liquidity premium, we have

compared the total issued value of the individual comparable bonds to the value of the bonds included in the Generic Utility index, the logic being that larger bond issues will tend to be more heavily traded and hence more liquid. Figure 7 shows that the average value outstanding of the bonds issued by the comparable companies is lower than that the value outstanding of the bonds issued by the companies included in the Generic Utility index.[40] We conclude it is likely that the higher debt spreads for the bonds of comparable peers is because these bonds are less liquid than the bonds that make up the Generic Utility index.

FIGURE 7: VALUE OF OUTSTANDING BOND ISSUES FOR VARIOUS FIRMS



Source: Bloomberg and Brattle calculations

105. We also understand from the ACM that the Dutch water distribution firms are relatively small, and finance their activities using bank debt rather than by issuing bonds. If the Dutch water firms were to issue bonds, they would be at the lower end of the scale in terms of the size of the issue. The bonds would also be less liquid than average, and we would expect that they would command some sort of liquidity premium. In our view, for the reasons stated above, the comparable peers are more comparable to the Dutch drinking water companies than the utility index. Therefore, we do not consider the utility index in the cost of debt.

106.

107. Based on the considerations above, we estimate the debt premium for the WACC 2022-2023 using the simple average of the 0.71% spread for the generic industry bonds and the 1.17% spread for the

[40] The bonds selected by Bloomberg change day by day. These are bonds used as of 19 May 2021.

comparable bonds, resulting in an average of 0.94%.[41] By adding the 0.94% spread to a RFR of -0.06%, plus 15 basis points to account for the cost of issuing debt, we obtain a pre-tax cost of debt of 1.03%.

108. We estimate the debt premium for the WACC 2022-2024 based on the 10-year average spread for the comparable bonds, equal to 1.13%. By adding the 1.13% spread to a RFR of 0.88%, plus 15 basis points to account for the cost of issuing debt, we obtain a pre-tax cost of debt of 2.16%.

[41] (0.71%+1.17%(/2=0.94%.

VIII. WACC

109. Based on the preceding calculations and discussions, Table 16 illustrates the overall calculation of the nominal WACC for drinking water distribution in the Netherlands.[42]

TABLE 16: WACC FOR DRINKING WATER DISTRIBUTION

			WACC 2022-2023	WACC 2022-2024
Gearing (D/A)	[1]	Section VI	47.15%	47.15%
Gearing (D/E)	[2]	[1]/(1-[1])	89.22%	89.22%
Tax rate	[3]	Assumed	0.00%	0.00%
Risk free rate - Equity	[4]	Section II	-0.06%	-0.06%
Asset beta	[5]	Section V	0.39	0.39
Equity beta	[6]	[5]x(1+(1-[3])x[2])	0.74	0.74
Equity Risk Premium	[7]	Section III	5.00%	5.00%
After-tax cost of equity	[8]	[4]+[6]x[7]	3.65%	3.65%
Risk free rate - Debt	[9]	Section II	-0.06%	0.88%
Debt premium	[10]	Section VII	0.94%	1.13%
Non-interest fees	[11]	Assumed	0.15%	0.15%
Pre-tax cost of debt	[12]	[9]+[10]+[11]	1.03%	2.16%
Nominal after-tax WACC	[13]	((1-[1])x[8])+([1]x(1-[3])x[12])	2.41%	2.95%
Nominal pre-tax WACC	[14]	[13]/(1-[3])	2.41%	2.95%

[42] The method assumes that since the water companies are publicly held and do not pay taxes, a tax rate of zero should be applied.

Appendix A. Rating Analysis for the Dutch Drinking Water Companies

110. In this appendix we first analyse Moody's rating methodology for regulated water utilities[43] and then apply it to estimate the likely credit rating of the Dutch drinking water companies using data from their annual accounts and information derived from Moody's credit rating decisions for TenneT and other rated energy networks in the Netherlands.

A.I. Moody's Credit Rating Methodology For Regulated Water Utilities

111. Moody's considers a broad number of factors to determine the credit rating of regulated water utilities, broadly related to the regulatory environment in which they operate and their current financial position and attitude towards risk. Figure 8, below, illustrates the different factors considered by Moody's along with the weight they carry for determining the over credit score.

112. The **Business Profile** of the regulated water utility accounts for 50% of the credit rating. This factor is divided in a number of sub-factors, relating to the stability and predictability of the regulatory environment (15%), asset ownership (5%), the ability to recover costs and investments (15%), revenue risk (5%), and the complexity of the investment program (10%). In rating these factors Moody's makes qualitative considerations about the regulatory environment in which the firms operate. For example, in rating the "stability and predictability of the regulatory environment", Moody's would assign the highest scores to "*Issuers operating under regulatory regimes that have a very long track record of clearly defined risk allocation principles, which have been consistently applied and transparently disclosed to the public*", and the lowest scores to "*Issuers operating in a jurisdiction that has not implemented a defined regulatory framework and/or is extremely unpredictable or politically driven*".[44] Additional detail on the rating of these sub-factors can be found in Moody's Rating Methodology.

113. **Leverage and coverage ratios** account for another 40% of the credit rating. These financial ratios measure the ability of the regulated company to repay its debt. In particular, Moody's considers four (4) ratios:

    a. The interest coverage ratio (**FFO Interest Coverage**) is sought to measure the capacity of the issuer to service its debt from its cash flows, or funds from operations (FFO);

    b. Leverage (measured as **Net Debt over RAB**) measures the overall capacity of the issuer to repay its debt, as regulated water utilities service their debt principally through the return they earn on the capital invested;

[43] Moody's Investor Services, "Rating Methodology: Regulated Water Utilities", June 2018 ("Moody's Rating Methodology").

[44] Moody's Rating Methodology, p. 7.

c. The **FFO to Net Debt** ratio is a measure of "dynamic leverage". This measure "*can be a useful indicator of a company's ability to generate cash flows over a period of time.*"

d. The Retained Cash Flows or **RCF to Net Debt** ratio is also an indicator for financial leverage. However, in contrast to FFO to Net Debt, it considers the strength of a water utility's cash flow after dividend payments are made.

114. Figure 12, below, details the ratings that Moody's assigns for different values f these ratios. Additional detail on the calculation of these ratios can be found in Moody's Rating Methodology.

115. **Financial policy** accounts for the remaining 10% of the credit rating. This factor relates to "management and shareholder tolerance for financial risk". In rating this factor, Moody's aims to "*assess the likelihood that financial policy decisions, in their totality, could add uncertainty to future cash flow levels and divert resources away from creditors. In this regard, management's track record and their public commitment to maintaining the issuer's credit quality are key considerations.*" [45]

116. Finally, in addition to the factors above, which contribute to the determination of a baseline rating, Moody's considers whether to apply an **uplift for structural considerations**,[46] which can result in an uplift of up to three notches for issuers that benefit from structural enhancements in their corporate structure, their regulatory licence or their financing arrangements. Additional details on the applicability of a two-notch uplift to the baseline rating of regulated utilities in the Netherlands is provided in the following section.

FIGURE 8: MOODY'S SCORECARD FOR RATING REGULATED WATER UTILITIES[47]

EXHIBIT 1
Scorecard for Regulated Water Utilities

Rating Factors	Factor Weighting	Sub-Factors	Sub-Factor Weighting
BUSINESS PROFILE	50%	Stability and Predictability of Regulatory Environment	15%
		Asset Ownership Model	5%
		Cost and Investment Recovery (Sufficiency & Timeliness)	15%
		Revenue Risk	5%
		Scale and Complexity of Capital Programme & Asset Condition Risk	10%
FINANCIAL POLICY	10%	Financial Policy	10%
LEVERAGE AND COVERAGE	40%	Adjusted Interest Coverage OR FFO Interest Coverage	12.5%
		Net Debt / Regulated Asset Base OR Debt/Capitalisation	10%
		FFO / Net Debt	12.5%
		RCF / Net Debt	5%
Total	100%	Total	100%
UPLIFT FOR STRUCTURAL CONSIDERATIONS		Up to 3 notches	

[45] Moody's Rating Methodology, p. 16.

[46] Moody's Rating Methodology, p. 4.

[47] Moody's Rating Methodology, p. 4.

117. Moody's determines the credit rating of regulated water utilities in a number of steps:

a. First, it assigns a rating and score to each sub-factor (see Figure 9).

b. Second, it determines an overall score as a weighted sum of the sub-factor scores. The sub-factor weight is calculated as the product of the sub-factor weight reported in Figure 8 times a further weight for the sub-factor rating reported in Figure 10 (which assigns a larger weight to sub-factors that receive a lower rating).

c. Based on the overall score determined in step 2, Moody's determines a baseline rating according to the correspondence reported in Figure 11.

d. Finally, Moody's evaluates whether the baseline rating should be adjusted to incorporate an uplift from structural considerations.

FIGURE 9: MOODY'S SCORE BY RATING[48]

Aaa	Aa	A	Baa	Ba	B	Caa
1	3	6	9	12	15	18

FIGURE 10: MOODY'S FACTOR WEIGHTING BY RATING[49]

Aaa	Aa	A	Baa	Ba	B	Caa
1	1	1	1.15	2	3	5

[48] Moody's Rating Methodology, p. 5.

[49] Moody's Rating Methodology, p. 5.

FIGURE 11: MOODY'S BASELINE RATING BY OVERALL SCORE[50]

Indicated Outcome	Overall Score
Aaa	x < 1.50
Aa1	1.50 ≤ x < 2.50
Aa2	2.50 ≤ x < 3.50
Aa3	3.50 ≤ x < 4.50
A1	4.50 ≤ x < 5.50
A2	5.50 ≤ x < 6.50
A3	6.50 ≤ x < 7.50
Baa1	7.50 ≤ x < 8.50
Baa2	8.50 ≤ x < 9.50
Baa3	9.50 ≤ x < 10.50
Ba1	10.50 ≤ x < 11.50
Ba2	11.50 ≤ x < 12.50
Ba3	12.50 ≤ x < 13.50
B1	13.50 ≤ x < 14.50
B2	14.50 ≤ x < 15.50
B3	15.50 ≤ x < 16.50
Caa1	16.50 ≤ x < 17.50
Caa2	17.50 ≤ x < 18.50
Caa3	18.50 ≤ x < 19.50

FIGURE 12: MOODY'S RATING OF LEVERAGE AND COVERAGE FINANTIAL RATIOS[51]

Factor 3 – Leverage and Coverage (40%)

The following tables show the scorecard-scoring categories for each Leverage and Coverage sub-factor and the weighting thereof.

Rating Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Adjusted Interest Coverage Ratio (1)	12.5%	≥8x	4.5-8x	2.5-4.5x	1.5-2.5x	1.2-1.5x	1-1.2x	<1x
OR		OR	OR	OR	OR	OR	OR	OR
FFO Interest Coverage (2)		≥10x	7-10x	4.5-7x	2.5-4.5x	1.8-2.5x	1.5-1.8x	<1.5x
Net Debt / Regulated Asset Base (3)	10%	<25%	25-40%	40-55%	55-70%	70-85%	85-100%	≥100%
OR								
Debt / Capitalisation								
FFO / Net Debt	12.5%	≥40%	25-40%	15-25%	10-15%	6-10%	4-6%	<4%
RCF / Net Debt	5%	≥30%	20-30%	10-20%	6-10%	4-6%	2-4%	<2%

Notes:

(1) The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available and can be verified by from an independent source – In many cases, publications from the regulatory authority itself. For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO. Capital Charges represent expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB, including regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

(2) In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

(3) For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB. For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where RAB may not be consistently available, we use Debt to Capitalisation.

A.II. Rating the Dutch Drinking Water Companies

118. The Dutch drinking water companies are not rated. Accordingly, to determine whether a target level of gearing would be consistent with a single-A rating, we have collected information on the actual

[50] Moody's Rating Methodology, p. 6.

[51] Moody's Rating Methodology, p. 21.

gearing and current financial position of the Dutch drinking water companies and reviewed recent Moody's rating decisions for TenneT and other rated energy networks in the Netherlands.

119. We have applied Moody's rating methodology to estimate a rating for each of the Dutch drinking water companies as follows:

a. We calculate the leverage and coverage ratios and apply Moody's rating guidelines to assign a credit score on these sub-factors.

b. We set the credit score that each water company would get on the other rating sub-factors equal to the score that Moody's has assigned to TenneT in its latest rating decision.[52]

c. We apply Moody's methodology to convert the credit scores to a 'baseline' credit rating.

d. We then apply a two-notch uplift to the baseline rating to reflect the Dutch drinking water companies' public ownership, in line with two-notch rating uplift that Moody's applies to TenneT, Gasunie, Alliander and Enexis.[53]

120. Table 17, below, reports our calculation of the four leverage and coverage ratios considered by Moody's for Dutch Drinking Water companies, as of December 2019. At the top of the table we report the range of values of each metric for which Moody's would assign a BBB-rating.

a. **FFO Interest Coverage**: Moody's assigns a BBB-rating for this sub-factor for a value of the ration between 2.5 and 4.5. The ratio is calculated as FFO plus Interest Expense divided by Interest Expense. Higher values of the ratio indicate higher availability of funds relative to interest, and thus higher ratings. All Dutch drinking water companies have a value of this ratio above the BBB-threshold, consistent with a rating equal or higher than A.

b. **Net Debt over RAB**: Moody's assigns a BBB-rating to leverage or gearing (D/A) levels in the range 55%-70%. As the table indicates, most Dutch drinking water companies – with the exception of Brabant Waters and Evides – are highly levered, with an average gearing of 56.0%, consistent for a BBB-rating on this sub-factor.

c. **FFO over Net Debt**: Moody's assigns a BBB-rating for this sub-factor for a value of the ratio between 10% and 15%. Higher values of this ratio lead to a higher rating. As the table indicates, most Dutch drinking water companies – with the exception of Brabant Waters and Evides – have a value of the FFO/Net Debt Ratio within or in close proximity of the BBB range.

d. **RCF over Net Debt**: The RCF/Net Debt Ratio is similar to the FFO/Net Debt Ratio, but nets dividends out of the calculation. RCF are in fact calculated as FFO minus Dividends. Moody's assigns a BBB-rating for this sub-factor for a value of the ratio between 6% and 10%. Higher values of this ratio lead to a higher rating. As the table indicates, all Dutch drinking water companies except for Vitens and WNL have an RCF/Net Debt Ratio consistent with a rating equal or higher than A.

---

[52] See Moody's Investor Services, "TenneT Holding B.V.: Update following 2019 results", May 2020.

[53] See Moody's Investor Services, "N.V. Nederlandse Gasunie: Update following the publication of Draft Method Decisions", November 2020; Moody's Investor Services, "TenneT Holding B.V.: Update following 2019 results", May 2020; Moody's Investor Services, "Alliander N.V.: Update to credit analysis", December 2020; and Moody's Investor Services, "Enexis Holding N.V.: Update to credit analysis", April 2020.

TABLE 17: LEVERAGE AND COVERAGE OF THE DUTCH WATER COMPANIES (DECEMBER 2019)

		FFO Interest Coverage	Net Debt/RAB	FFO/Net Debt	RCF/Net Debt
BBB Range		**2.5-4.5x**	**55%-70%**	**10%-15%**	**6-10%**
		[A]	[B]	[C]	[D]
Dutch Water Companies					
Brabant Water	[1]	70.35	35.8%	22.5%	22.5%
Dunea	[2]	7.40	60.4%	10.3%	10.3%
Evides	[3]	17.94	42.1%	30.5%	21.1%
Oasen	[4]	6.14	57.9%	12.0%	12.0%
PWN	[5]	4.70	64.8%	10.4%	10.2%
Vitens	[6]	4.77	70.1%	9.1%	8.7%
Waternet	[7]	n.a.	n.a.	n.a.	n.a.
WBG	[8]	7.32	54.4%	14.4%	14.4%
WMD	[9]	n.a.	n.a.	n.a.	n.a.
WML	[10]	4.92	62.5%	9.6%	9.6%
Mean	**[11]**	**15.44**	**56.0%**	**14.9%**	**13.6%**

[A]: (Funds from Operations + Interest Expense) / Interest Expense. FFO are calculated as: Cash from Operations - Changes in Non-Cash Working Capital.
[B]: Net Debt/RAB.
[C]: Funds from Operations/Net Debt.
[D]: RCF/Net Debt. RCF are calculated as: FFO - Dividends.
[1]-[10]: data from companies' annual reports.

121. In Table 18, below, we estimate the likely rating of the representative Dutch drinking water company based on the methodology discussed above and applying the average leverage and coverage ratios of the Dutch drinking water companies. Overall, we estimate that a representative Dutch drinking water company would likely get a baseline credit rating of A-, which increases to A+ when we apply a two-notch uplift.

122. We believe that applying a two-notch uplift to the baseline rating of the drinking water companies is reasonable. Dutch Energy Networks benefit from the stability of the Dutch regulatory framework and from the higher rating of the Dutch government debt (AAA). In rating the Dutch energy networks Gasunie and TenneT, for example, the rating agency Moody's applies two-notch uplift to the networks' baseline ratings to account for the Dutch government's ownership interest and the strategic importance of the business to national energy policy in the Netherlands.[54] Similarly, Moody's has applied two-notch uplifts also to the baseline ratings of the Dutch DSOs Alliander and Enexis, reflecting a strong probability of support from their public owners, the importance of the networks' operations for the regional economy, and the strong governance framework in the Netherlands with oversight by the national government.[55]

[54] See Moody's Investor Services, "N.V. Nederlandse Gasunie: Update following the publication of Draft Method Decisions", November 2020; and Moody's Investor Services, "TenneT Holding B.V.: Update following 2019 results", May 2020.

[55] See Moody's Investor Services, "Alliander N.V.: Update to credit analysis", December 2020; and Moody's Investor Services, "Enexis Holding N.V.: Update to credit analysis", April 2020.

TABLE 18: LIKELY RATING OF THE REPRESENTATIVE DUTCH DRINKING WATER COMPANY

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	15.44	AAA	1.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	56.0%	BBB	9.00	1.15	0.12
FFO/Net Debt	[11]	See note	13%	14.9%	BBB	9.00	1.15	0.14
RCF/Net Debt	[12]	See note	5%	13.6%	A	6.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**7.35**					
Baseline Rating	**[15]**	**See note**	**A-**					
Rating with uplift	**[16]**		**A+**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

123. In section VI, we determined that a target gearing (D/A) level of 47.15%, calculated as the median gearing (D/A) among European water and network companies. The analysis above indicates that such a level of gearing is consistent with a single-A rating. In fact, Table 18 demonstrates that a representative Dutch drinking water company with a gearing of 56.0% would be able to obtain a single-A rating. A lower gearing of 47.15% would, if anything, improve the companies' ratings on all four leverage and coverage ratios. Put simply, if a Dutch drinking water company is able to obtain a single-A rating with a gearing of 56.0%, then it will obtain a rating equal or higher that single-A with a 47.15% gearing.

124. Table 19 through Table 26 detail our calculation of the likely credit rating of the individual Dutch Water companies.

TABLE 19: RATING OF BRABANT WATER

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	70.35	AAA	1.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	35.8%	AA	3.00	1.00	0.10
FFO/Net Debt	[11]	See note	13%	22.5%	A	6.00	1.00	0.13
RCF/Net Debt	[12]	See note	5%	22.5%	AA	3.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**6.29**					
Baseline Rating	**[15]**	**See note**	**A**					
Rating with uplift	**[16]**		**AA-**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 20: RATING OF DUNEA

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	7.40	AA	3.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	60.4%	BBB	9.00	1.15	0.12
FFO/Net Debt	[11]	See note	13%	10.3%	BBB	9.00	1.15	0.14
RCF/Net Debt	[12]	See note	5%	10.3%	A	6.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**7.56**					
Baseline Rating	**[15]**	**See note**	**BBB+**					
Rating with uplift	**[16]**		**A**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 21: RATING OF EVIDES

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	17.94	AAA	1.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	42.1%	AA	3.00	1.00	0.10
FFO/Net Debt	[11]	See note	13%	30.5%	AA	3.00	1.00	0.13
RCF/Net Debt	[12]	See note	5%	21.1%	AA	3.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**5.95**					
Baseline Rating	**[15]**	**See note**	**A**					
Rating with uplift	**[16]**		**AA-**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 22: RATING OF OASEN

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	6.14	A	6.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	57.9%	BBB	9.00	1.15	0.12
FFO/Net Debt	[11]	See note	13%	12.0%	BBB	9.00	1.15	0.14
RCF/Net Debt	[12]	See note	5%	12.0%	A	6.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**7.89**					
Baseline Rating	**[15]**	**See note**	**BBB+**					
Rating with uplift	**[16]**		**A**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 23: RATING OF PWN

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	4.70	A	6.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	64.8%	BBB	9.00	1.15	0.12
FFO/Net Debt	[11]	See note	13%	10.4%	BBB	9.00	1.15	0.14
RCF/Net Debt	[12]	See note	5%	10.2%	A	6.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**7.89**					
Baseline Rating	**[15]**	**See note**	**BBB+**					
Rating with uplift	**[16]**		**A**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 24: RATING OF VITENS

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	4.77	A	6.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	70.1%	BB	12.00	2.00	0.20
FFO/Net Debt	[11]	See note	13%	9.1%	BB	12.00	2.00	0.25
RCF/Net Debt	[12]	See note	5%	8.7%	BBB	9.00	1.15	0.06
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**9.17**					
Baseline Rating	**[15]**	**See note**	**BBB**					
Rating with uplift	**[16]**		**A-**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 25: RATING OF WBG

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	7.32	AA	3.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	54.4%	A	6.00	1.00	0.10
FFO/Net Debt	[11]	See note	13%	14.4%	BBB	9.00	1.15	0.14
RCF/Net Debt	[12]	See note	5%	14.4%	A	6.00	1.00	0.05
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**7.28**					
Baseline Rating	**[15]**	**See note**	**A-**					
Rating with uplift	**[16]**		**A+**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

TABLE 26: RATING OF WML

Factor		Notes	Factor Weighting [A]	Estimate [B]	Rating [C]	Score [D]	Rating factor [E]	Adjusted Weight [F]
Business Profile	**[1]**	**SUM([2]-[6])**	**50%**					
Stability and Predictability of Regulatory Environment	[2]	See note	15%		A	6.00	1.00	0.15
Asset Ownership Model	[3]	See note	5%		AA	3.00	1.00	0.05
Cost and Investment Recovery (Sufficiency & Timeliness)	[4]	See note	15%		A	6.00	1.00	0.15
Revenue Risk	[5]	See note	5%		A	6.00	1.00	0.05
Scale and Complexity of Capital Programme & Asset Condition Risk	[6]	See note	10%		BB	12.00	2.00	0.20
Financial Policy	**[7]**	See note	**10%**		BBB	9.00	1.15	0.12
Leverage and Coverage	**[8]**	**SUM([9]-[12])**	**40%**					
FFO Interest Coverage	[9]	See note	13%	4.92	A	6.00	1.00	0.13
Net Debt/RAB	[10]	See note	10%	62.5%	BBB	9.00	1.15	0.12
FFO/Net Debt	[11]	See note	13%	9.6%	BB	12.00	2.00	0.25
RCF/Net Debt	[12]	See note	5%	9.6%	BBB	9.00	1.15	0.06
Total	**[13]**	**[1]+[7]+[8]**	**100%**					
Overall Score	**[14]**	**See note**	**8.70**					
Baseline Rating	**[15]**	**See note**	**BBB**					
Rating with uplift	**[16]**		**A-**					

[2],[3],[4],[5],[6],[7]: See Moody's, TenneT Holding B.V.: Update following 2019 results, May 2020
[9]-[12]: See Table 17
[14]: Scores weighted average
[15]: See Figure 11

Appendix B. Bonds Issued by Firms Engaged in Similar Activities

Company	Maturity date	Currency	Bond yield (%)			10-year sovereign (%)			Bond spread (%)			Amount outstanding
			10 yr	5 yr	2 yr	10 yr	5 yr	2 yr	10 yr	5 yr	2 yr	
	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
SGSP Australia Assets Pty Ltd	07/07/2027	USD	3.67	3.67		2.64	2.64		1.03	1.03		500,000,000
Hydro One Inc	13/01/2022	CAD	2.91			1.82			1.09			600,000,000
Anglian Water Services Financing PLC	21/08/2023	GBP	3.40			2.45			0.95			200,000,000
Wales & West Utilities Finance PLC	29/03/2030	GBP	1.65	1.65	1.60	0.54	0.54	0.51	1.11	1.11	1.09	300,000,000
AusNet Services Holdings Pty Ltd	25/08/2030	EUR	0.51	0.51	0.51	-0.46	-0.46	-0.46	0.97	0.97	0.97	500,000,000
SGSP Australia Assets Pty Ltd	29/07/2026	USD	3.50	3.50		2.26	2.26		1.25	1.25		500,000,000
AusNet Services Holdings Pty Ltd	13/02/2024	EUR	2.10			0.99			1.12			350,000,000
Red Electrica Financiaciones SAU	21/04/2026	EUR	0.89	0.89		1.36	1.36		n/a	n/a		500,000,000
SGSP Australia Assets Pty Ltd	09/04/2023	USD	3.93			2.39			1.54			500,000,000
Hydro One Inc	03/06/2030	CAD	2.39	2.39	2.39	0.80	0.80	0.80	1.59	1.59	1.59	400,000,000
AusNet Services Holdings Pty Ltd	26/02/2027	EUR	1.30	1.22		0.27	0.28		1.03	0.94		560,000,000
TenneT Holding BV	09/02/2022	EUR	3.34			2.23			1.11			500,000,000
Yorkshire Water Finance PLC	01/08/2029	GBP	2.18	2.18	1.93	0.86	0.86	0.57	1.31	1.31	1.36	250,000,000
Northern Powergrid Holdings Co	15/12/2022	GBP	3.81			2.19			1.62			200,000,000
Western Power Distribution South West PLC	25/03/2027	GBP	2.38	2.33		1.26	1.24		1.12	1.09		250,000,000
State Grid Europe Development 2014 PLC	26/01/2027	EUR	1.94	1.87		3.26	3.32		n/a	n/a		300,000,000
Wales & West Utilities Finance PLC	13/12/2023	GBP	3.49			2.54			0.95			150,000,000
Red Electrica Financiaciones SAU	24/04/2025	EUR	1.68			1.80			n/a			500,000,000
Enexis Holding NV	26/01/2022	EUR	2.74			1.83			0.91			300,000,000
Eastern Power Networks PLC	31/03/2025	GBP	3.42			2.10			1.32			132,279,000
Vier Gas Transport GmbH	10/07/2023	EUR	2.63			1.65			0.98			750,000,000
Eastern Power Networks PLC	08/03/2024	GBP	3.73			2.50			1.24			350,000,000
RTE Reseau de Transport d'Electricite SADIR	28/06/2022	EUR	3.23			2.55			0.68			750,000,000
Eastern Power Networks PLC	30/09/2021	GBP	3.94			2.03			1.91			400,000,000
South Eastern Power Networks PLC	12/11/2031	GBP	1.22	1.22	1.22	0.58	0.58	0.58	0.64	0.64	0.64	300,000,000
South Eastern Power Networks PLC	05/06/2026	GBP	2.70	2.29		1.48	1.18		1.22	1.11		269,997,000
AltaLink LP	28/11/2022	CAD	3.41			2.57			0.84			275,000,000
Wales & West Utilities Finance PLC	07/03/2028	GBP	2.32	2.32		1.35	1.35		0.97	0.97		150,000,000
Western Power Distribution East Midlands PLC	17/01/2023	GBP	3.55			2.23			1.32			700,000,000
Anglian Water Services Financing PLC	15/01/2029	GBP	2.33	2.33	1.96	1.17	1.17	0.74	1.16	1.16	1.22	200,000,000
Yorkshire Water Finance PLC	28/05/2027	GBP	2.24	2.24		1.25	1.25		0.98	0.98		135,476,000
Yorkshire Water Finance PLC	21/02/2023	GBP	3.39			2.26			1.13			210,692,000
Anglian Water Services Financing PLC	05/10/2027	GBP	2.15	2.15		1.35	1.35		0.80	0.80		250,000,000
AltaLink LP	06/11/2023	CAD	3.39			2.27			1.12			500,000,000
DWR Cymru Financing UK PLC	31/03/2026	GBP	0.14	n/a		1.55	1.19		n/a	n/a		128,600,000
Western Power Distribution West Midlands PLC	16/04/2032	GBP	1.73	1.73	1.73	0.87	0.87	0.87	0.86	0.86	0.86	800,000,000
Western Power Distribution South West PLC	16/05/2029	GBP	2.38	2.38	2.02	0.99	0.99	0.64	1.39	1.39	1.37	250,000,000
Anglian Water Services Financing PLC	30/07/2030	GBP	1.64	1.64	1.64	0.47	0.47	0.47	1.17	1.17	1.17	246,000,000
Vier Gas Transport GmbH	12/06/2025	EUR	1.64	1.18		0.59	0.13		1.05	1.05		750,000,000
TenneT Holding BV	21/02/2023	EUR	2.80			1.94			0.86			500,000,000
Northern Powergrid Yorkshire PLC	01/04/2025	GBP	2.95			1.88			1.07			150,000,000
Western Power Distribution West Midlands PLC	09/05/2025	GBP	3.34	2.96		2.04	1.57		1.30	1.39		250,000,000
Western Power Distribution West Midlands PLC	16/05/2028	GBP	n/a	n/a	n/a	1.34	1.34	1.17	n/a	n/a	n/a	30,000,000
Golden State Water Co	25/01/2029	USD	3.88	3.88	3.45	2.50	2.50	1.90	1.38	1.38	1.55	40,000,000
Yorkshire Water Finance PLC	17/04/2031	GBP	1.57	1.57	1.57	0.40	0.40	0.40	1.17	1.17	1.17	254,974,000
RTE Reseau de Transport d'Electricite SADIR	20/06/2029	EUR	0.88	0.88	0.53	0.25	0.25	-0.05	0.63	0.63	0.58	600,000,000
AusNet Services Holdings Pty Ltd	01/03/2030	EUR	0.90	0.90	0.83	-0.40	-0.40	-0.43	1.30	1.30	1.26	150,000,000
South Eastern Power Networks PLC	30/09/2030	GBP	1.61	1.61	1.61	0.46	0.46	0.46	1.14	1.14	1.14	300,000,000
RTE Reseau de Transport d'Electricite SADIR	12/09/2023	EUR	2.48			1.98			0.50			500,000,000
Golden State Water Co	23/03/2028	USD	4.04	4.04		2.64	2.64		1.40	1.40		15,000,000
EPCOR Utilities Inc	28/06/2029	CAD	2.93	2.93	2.62	1.62	1.62	1.36	1.31	1.31	1.26	150,000,000
EPCOR Utilities Inc	28/06/2029	CAD	2.95	2.95	2.56	1.59	1.59	1.22	1.36	1.36	1.34	150,000,000
Ameren Illinois Co	15/12/2028	USD	5.09	5.09	4.63	2.53	2.53	1.91	2.56	2.56	2.72	60,000,000
Anglian Water Services Financing PLC	30/07/2024	GBP	0.89			2.46			n/a			75,000,000
Western Power Distribution South Wales PLC	14/03/2029	GBP	n/a	n/a	n/a	1.09	1.09	0.70	n/a	n/a	n/a	50,000,000
DWR Cymru Financing UK PLC	31/03/2027	GBP	n/a	n/a		1.26	1.24		n/a	n/a		75,000,000
TenneT Holding BV	03/06/2030	EUR	0.46	0.46	0.46	-0.30	-0.30	-0.30	0.76	0.76	0.76	200,000,000
RTE Reseau de Transport d'Electricite SADIR	06/11/2028	EUR	1.20	1.20	0.66	0.50	0.50	-0.07	0.71	0.71	0.74	50,000,000
Eastern Power Networks PLC	13/02/2025	GBP	0.51			1.93			n/a			40,000,000
Statnett SF	12/06/2026	EUR	0.61	0.37		0.32	0.17		0.29	0.20		70,000,000
AusNet Services Holdings Pty Ltd	02/03/2030	EUR	0.98	0.98	0.92	-0.40	-0.40	-0.43	1.38	1.38	1.35	11,000,000
South Eastern Power Networks PLC	13/02/2025	GBP	0.52			1.93			n/a			25,000,000
RTE Reseau de Transport d'Electricite SADIR	30/10/2028	EUR	1.20	1.20	0.68	0.51	0.51	-0.07	0.70	0.70	0.75	50,000,000
Eastern Power Networks PLC	07/10/2025	GBP	0.45	0.23		1.59	1.03		n/a	n/a		35,000,000
Golden State Water Co	01/12/2030	USD	2.82	2.82	2.82	1.06	1.06	1.06	1.76	1.76	1.76	20,000,000
Average									1.13	1.13	1.21	

Notes and sources:
Mid yields to maturity reported by Bloomberg. Government bond yields from Bank of Canada, Bank of England, Federal Reserve and Norges Bank.
[C]: Average yields from 01/05/2011 to 30/04/2021 (included) if the yields are in the date range of 9 to 11 years from the maturity date.
[D]: Average yields from 01/05/2016 to 30/04/2021 (included) if the yields are in the date range of 9 to 11 years from the maturity date.
[E]: Average yields from 01/05/2019 until 30/04/2021 (included) if the yields are in the date range of 9 to 11 years from the maturity date.
[F], [G], [H]: Average 10 year government bond yields in the same period as that of the bond yields included. Government bond yields are assigned based on the currency.
[I]: [C]-[F]. [J]: [D]-[G]. [K]: [E]-[H].