# The WACC for Heating Companies in the Netherlands


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# I. Introduction and Summary

1. Since 2014, the Dutch Authority for Consumers and Markets (ACM) is responsible for setting the maximum prices that heat suppliers in the Netherlands can charge to consumers and small and medium companies with a connection up to 100 kW for the supply of heat.[1] Currently, there are about 400 heating companies and 1400 heating networks operating in the Netherlands,[2] connecting about 400,000 houses, roughly 6% of Dutch households. We further understand that heating companies differ greatly in terms of size, ownership structure, source of generation, and age of the network and profitability, with larger, older networks typically earning more profits.

2. The ACM sets the maximum heating tariffs nationally, so there is no differentiation based on the heating companies' varying characteristics.[3] As of the time of preparing this report, the ACM sets five different tariffs components for: (i) supply, (ii) metering, (iii) connection, (iv) disconnection, and (v) the rental of heat exchangers. The tariffs for supply and metering are based on the "no more than usual" principle, which entails that consumers who rely on a heating company for their heat demand shall pay no more than if they had used natural gas for heating with a domestic boiler. The ACM sets the supply and metering tariffs annually using the most recent gas prices as reference prices. The tariffs for the connection and disconnection to the heating network and for the rental of heat exchangers are instead based on the actual costs of the 20 largest heating companies.

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[1] Unlike energy networks, heating companies are required by law to be integrated, so that production, transport and delivery are all performed by one single company, due to the very local nature of heat supply.

[2] This also includes lessors, housing corporations and owner's associations.

[3] Some of the differences between heating companies reflect non-systematic risks, which would not affect the companies' cost of capital or WACC. Nevertheless, there could also be different mixes of fixed and variable costs between heating companies (operating leverage) that would affect the cost of capital. However, it would be difficult to accurately measure this (likely small) difference based on listed companies. We note that even absent differences in operating leverage between companies, estimating a beta for heating is subject to some judgement and potential error. Trying to further differentiate between different types of heating companies would not be practical. Any differences in betas that result are more likely to be driven by the statistical error for the 'comparable' companies' chosen for the analysis, rather than representing a true difference in systematic risk and beta.

3. Since October 2021, the ACM must calculate a weighted average cost of capital (WACC) for the heating sector in general, to determine whether the actual returns of individual heating companies exceed an allowed reasonable return (the so called rate of return test). If a heating company exceeds the allowed reasonable return, i.e. the WACC, the ACM may determine to have the excess return be discounted in the future tariffs of that heat supplier through a correction factor.

4. The rate of return test is not a simple cap on the allowed returns for the heating companies. We understand that returns in excess of the calculated rate of return will not automatically result in ACM clawing back profits. Rather, returns in excess of the calculated rate will trigger the ACM to conduct a careful investigation as to whether the firm's profits are actually excessive. This investigation will consider efficiency incentives and the lifecycle of the network in question. For example, if the investigation shows that there are valid reasons underlying a realised return exceeding the calculated return – such as efficiency gains or less than reasonable returns in previous years – then the ACM may determine that the realised returns of the company were not unreasonable or excessive.

5. Relatedly, because the heating companies generally earn little profits or even make losses early in their lifecycle, the ACM calculates a WACC for the heating sector for the past five years (2018-2022), so it can consider historical returns of the heating companies to determine whether the reasonable return has been exceeded.

6. In 2022, the ACM instructed us to calculate, among other things, the WACC for the heating companies for the regulatory period 2023-2025 and for the historical period 2018-2022. This resulted in a draft Brattle report (the "2022 Brattle Report") and a draft WACC decision from the ACM.[4] However, the ACM failed to make a final WACC decision before the end of the calendar year.

[4] See Dan Harris and Lucrezio Figurelli, "The WACC for Heating Companies and Heat Exchangers in the Netherlands", draft of 9 July 2022 (available at: https://www.acm.nl/nl/publicaties/consultatie-adviesrapport-wacc-rendementstoets-en-afleversets). See also ACM, Draft WACC decision for heat suppliers, 29 August 2022 (available at: https://www.acm.nl/nl/publicaties/consultatie-ontwerpbesluit-wacc-warmteleveranciers#:~:text=In%20de%20beleidsregel%20heeft%20de,en%20de%20periode%202023%2D2025).

7. Within this context, the ACM has commissioned us to (i) update the calculation of the WACC for the heating sector for the period 2023-2025 and (ii) update the calculation of the cost of debt, gearing and resulting WACC for the historical period 2018-2022.

   As regards the WACC for the 2023-2025 period, the ACM has requested that we estimate the 2023 WACC using data as of 31 December 2022 – that is, using only data available prior to the date that the WACC will apply – and the WACC for 2024 and 2025 using the latest available information at the time of writing this report.

8. As regards the WACC for the years 2018-2022, the ACM has requested to update the calculation of the cost of debt and gearing to account for three factors:[5]

   a. First, in our July 2022 calculations we used data that did not include the cost of non-interest fees. The ACM has now asked us to update the calculation of the cost of debt – and the resulting WACC – for the historical period 2018-2022 including the cost of non-interest fees.

   b. Second, in our July 2022 calculations we calculated the cost of debt of the heating companies in each year using the actual cost of debt as of 31 December of the year prior the year for which we were calculating the cost of debt. However, the ACM has informed us that in July 2023 the Trade and Industry Appeals Tribunal (CBb) has issued a ruling ordering the ACM to calculate cost of debt for the heating companies in each year using the actual cost of debt of the heating companies in the same year.

   c. Third, the ACM has asked us to exclude one company that was initially included in our July 2022 calculation and to include data from four additional companies.

9. The ACM has not asked us to determine an adjustment to the WACC to allow for any asymmetric risk with the current heating sector regulation.[6] The ACM is still evaluating asymmetric risk and will discuss this matter at a later stage of the regulatory process.

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[5] Note that no update to the calculation of the cost of equity is necessary.

[6] As we further explain below, heating companies face potential asymmetric risk due to the combination of the "no more than usual" clause and the "rate of return test". Asymmetric risk arises when there is the possibility that a regulated firm will earn less than its cost of capital in some periods, but there is not sufficient opportunity to earn more than its cost of capital in other periods. As a result, the expected return will be less than the cost of capital. We understand that the heating companies are concerned that factors such as start-up losses and take-up risks could cause them to earn less than their cost of capital in some periods. Hence, limiting the actual return at the level of the WACC will prevent them from earning their

10. In preparing this report, we use data up to and including 15 June 2023 to calculate the WACC for 2024-2025 and data up to and including 31 December 2022 to calculate the WACC for 2023.

# A. The Systematic Risk of Heating Companies

11. Understanding the operations and the systematic risks of heating companies is essential to estimate a reasonable rate of return for these activities. In particular, because the Dutch heating companies are not listed, we need to estimate beta by reference to a group of comparable companies engaged in similar activities and facing similar systematic risks as the regulated companies.

12. Based on an analysis of the activities and risks of heating companies we have identified four comparable sectors that can be used to estimate the beta of heating companies:

    a. Similar to **power generation companies**, heating companies' profits are sensitive to changes in the price of the inputs used in heat generation. Heating companies also face demand risks, but at a much lower level, because the turnover of homes connected to the heat network is limited.

    b. Similar to energy **networks**, heating companies develop and operate a monopolistic network at regulated prices with limited customer turnover. Operation of the heat network is thus comparable to the operation of an energy network.

    c. **Utilities** are also good comparators for the heating companies, as they provide essential services to consumers, generally facing similar risk exposure as the heating companies.

    d. Finally, **telecom operators**, and particularly operators who make significant investments in new generation fiber networks, experience similar risks as the heating companies, particularly with respect to buildout and take-up risks.

13. Ideally, we would estimate the asset beta for the heating sector using a weighted average across sectors, using data about the relative contribution of different activities and risks to

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cost of capital on average. However, as explained above, the rate of return test is not simply a cap on the allowed returns that a company will be allowed to make. Rather, the ACM will conduct an investigation to determine whether the realized returns were unreasonable. Accordingly, whether the "no more than usual" clause and the "rate of return test" will actually result in asymmetric risk depends on the actual implementation of the test.

the profitability of heating companies. However, this data is not available to us. Hence, we take a simple average of the median asset betas across the four sectors.

## B. Cost of Equity

14. **Risk-free rate**. In line with ACM's methodology, we calculate the risk-free rate as the three-year average yield on 20-year government bonds in the Netherlands and in Germany.

    a. Over the three-year period ending on 31 December 2022, yields were 0.53% on average in the Netherlands, and 0.32% on average in Germany. Taking the average between the two gives us a risk-free rate of 0.43%, which we apply to the 2023 WACC.

    b. Over the three-year period ending on 15 June 2023, yields were 0.94% on average in the Netherlands, and 0.72% on average in Germany. Taking the average between the two gives us a risk-free rate of 0.83%, which we apply to the 2024-2025 WACC.

15. **Equity Risk Premium**. 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 Eurozone markets. The methodology requires that the projected ERP should be based on the average of the arithmetic and geometric averages of the 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%, which we apply to all relevant WACC periods.

16. **Selection of the Peer Groups**. To select our four peer groups of comparable companies, we start with the same candidate peers we considered in the 2022 Brattle Report. We then exclude companies that are no longer listed and then check that the shares of the candidate peers are sufficiently liquid to provide a reliable beta estimate. We apply the screening criteria separately for the 2023 WACC and the 2024-2025 WACC. After application of these criteria we end up with 18 power generation companies, 6 energy networks, 16 utilities and 8 alternative telecom operators depending on the relevant WACC period.

17. **Beta**. In line with the ACM methodology we estimate equity betas for the peer groups by regressing the daily returns of individual stocks on market returns over sample periods of three years as of the relevant measurement dates. We calculate market returns using a broad

Eurozone index for companies operating in the Eurozone and a broad national index for UK companies. We calculate the gearing of each comparator as of each measurement date as the three-year average of quarterly gearing ratios obtained by dividing quarterly net debt over quarterly market capitalization. We then un-lever the equity betas using the Modigliani and Miller formula. Finally, we calculate the asset beta for the heating sector by taking the average of the median asset betas of the four comparable groups. The methodology results in an asset beta of 0.51 for the 2023 WACC and an asset beta of 0.44 for the 2024-2025 WACC.

# C. Cost of Debt and Gearing for 2023-2025

18. To calculate the actual cost of debt of the heating companies for the periods 2023 and 2024-2025, we use accounting data on interest payments, interest bearing debt and non-interest fees for 19 small and large heating companies in the Netherlands.[7]

19. Specifically, to calculate the cost of debt for the 2023 and 2024-2025 WACC, we use the actual cost of debt of the heating companies as of 31 December 2022 – being the latest available information at the time of writing this report – by taking the ratio between interest payments plus non-interest fees in 2022 and the average interest-bearing debt balance over 2021-2022.

20. We then calculate the cost of debt for the heating companies based on the weighted average cost of debt of the individual companies. Using the weighted average is preferable to using the mean or the median cost of debt. This is because it puts more weight on larger debt issuances with more stable interest rates. Application of this methodology results in a cost of debt of 3.31% for the 2023-2025 WACC (including non-interest fees).

21. The gearing used to re-lever the asset beta and to weight the cost of equity and the cost of debt should be consistent with the actual cost of debt of the heating companies. Accordingly,

[7] Note that in the 2022 Brattle Report, we used data for 24 companies. However, the ACM has asked us to exclude one company because the data they provided was not accurate. In the June 2023 update, two of these companies did not provide data anymore, while four new companies did; one of these four, however, had to be excluded because of inaccurate data, leading to a total of 24 companies. Furthermore, seven of the original 24 companies were effectively part of two separate groups, and have now reported their cost of debt data at the group level, effectively reducing the number of companies considered in the cost of debt calculation from 24 to 19. Finally, because some companies of this final set do not report interest-bearing debt and/or interest for 2022, this leads us to consider 15 and 13 companies for the calculation of the cost of debt and gearing, respectively.

we calculate the gearing of the heating companies as of 31 December of 2022 as the ratio of interest bearing debt over total assets. Overall, both the mean and median gearing are equal to approximately 44%. Accordingly, we select a gearing of 44% for the 2023 and 2024-2025 WACCs.[8]

# D. The WACC for the Heating Companies for 2023 and 2024-2025

22. Table 1 details our calculation of the WACC for the heating sector companies for 2023 and for 2024-2025.

**TABLE 1: WACC FOR THE HEATING SECTOR FOR 2023 AND THE 2024-2025 PERIOD**

| | | | WACC Period | |
|---|---|---|---|---|
| | | | 2023 | 2024-2025 |
| Gearing (D/A) | [1] | See note | 44.00% | 44.00% |
| Gearing (D/E) | [2] | [1]/(1-[1]) | 78.57% | 78.57% |
| Tax rate | [3] | ACM | 25.80% | 25.80% |
| Risk-free rate | [4] | See note | 0.43% | 0.83% |
| Asset beta | [5] | See note | 0.51 | 0.44 |
| Equity beta | [6] | [5]x(1+(1-[3])x[2]) | 0.81 | 0.69 |
| Equity Risk Premium | [7] | See note | 5.00% | 5.00% |
| After-tax cost of equity | [8] | [4]+[6]x[7] | 4.46% | 4.29% |
| Pre-tax cost of debt | [9] | See note | 3.31% | 3.31% |
| Nominal after-tax WACC | [10] | ((1-[1])x[8])+([1]x(1-[3])x[9]) | 3.58% | 3.48% |
| Nominal pre-tax WACC | [11] | [10]/(1-[3]) | 4.82% | 4.69% |

Sources and notes:

[1]: Brattle analysis of data provided by ACM on cost of debt for the heating companies. Gearing is assumed to be 44% for periods 2023 and 2024-2025.

[4]: Average risk-free rate in each WACC period.

[5]: Asset beta estimated in each WACC period.

[7]: Brattle elaboration based on DMS data.

[9]: Brattle analysis of data provided by ACM on cost of debt for the heating companies.

[8] Unlike the cost of debt, the calculation of gearing is not affected by the timing of bond issuances because it considers the ratio of the stock of interest bearing debt and the stock of total assets both at the end of each year. Therefore, gearing is less sensitive to outliers and taking a weighted average of the gearing as we have done for the cost of debt is not necessary.

# E. Cost of Debt, Gearing and the Resulting WACC for the Heating Companies for 2018-2022

23. We have updated the calculation of the cost of debt, gearing and the resulting WACC for the heating companies for the historical period 2018-2022. Table 2 details our calculation of the WACC for the years 2018-2022.[9]

**TABLE 2: WACC FOR THE HEATING COMPANIES FOR THE YEARS 2018-2022**

| | | WACC Period | | | | |
|---|---|---|---|---|---|---|
| | | 2018 | 2019 | 2020 | 2021 | 2022 |
| Gearing (D/A) | [1] | 43.00% | 43.00% | 41.00% | 41.00% | 44.00% |
| Gearing (D/E) | [2] | 75.44% | 75.44% | 69.49% | 69.49% | 78.57% |
| Tax rate | [3] | 25.00% | 25.00% | 25.00% | 25.00% | 25.80% |
| Risk-free rate | [4] | 0.86% | 0.81% | 0.67% | 0.32% | 0.02% |
| Asset beta | [5] | 0.47 | 0.47 | 0.54 | 0.53 | 0.54 |
| Equity beta | [6] | 0.74 | 0.74 | 0.81 | 0.81 | 0.85 |
| Equity Risk Premium | [7] | 5.00% | 5.00% | 5.00% | 5.00% | 5.00% |
| After-tax cost of equity | [8] | 4.55% | 4.49% | 4.75% | 4.37% | 4.27% |
| Pre-tax cost of debt | [9] | 2.47% | 3.04% | 3.00% | 3.41% | 3.31% |
| Nominal after-tax WACC | [10] | 3.39% | 3.54% | 3.72% | 3.63% | 3.47% |
| Nominal pre-tax WACC | [11] | 4.52% | 4.72% | 4.96% | 4.84% | 4.68% |

Sources and notes:
[1]: Table 17.
[2]: [1]/(1-[1]).
[3]: ACM.
[4]-[8]: 2022 Brattle Report, pag. 10, Table 3.
[9]: Table 16.
[10]: ((1-[1])x[8])+([1]x(1-[3])x[9]).
[11]: [10]/(1-[3]).

[9] As we explained above, no update to the calculation of the cost of equity is necessary. Accordingly, for beta, the ERP and the risk-free rate we have applied the values calculated in the 2022 Brattle Report. The calculation of these parameters is nevertheless detailed in Appendix A.III.

# II. The Systematic Risks of Heating Companies

24. Understanding the operations and the systematic risks of heating companies is essential to estimate a reasonable rate of return for these companies. More specifically, because the Dutch heating companies are not listed, we need to estimate beta by reference to a group of comparable companies engaged in similar activities and facing similar systematic risks as the regulated companies. In this Section we analyse the activities and risks of heating companies in order to identify a set of comparable sectors that can be used to estimate beta.

25. Heating companies are vertically integrated companies, responsible for the production, transport and delivery of heat to consumers. Heat is obtained from several sources – often a generation plant burning fossil fuels – and is transported as steam or hot water through a system of pipes. Steam and hot water are first delivered to a substation, before being delivered to end-consumers through the distribution heating network. Because demand fluctuates considerably over time, back-up boilers are also used at the substation to ensure stability of supply. Finally, in order to transfer heat from the heat network to their indoor system, consumers must rent a heat exchanger. The delivery of heat thus requires four main components: (i) a source of heat, (ii) a system of pipes, (iii) a substation with back up boilers, and (iv) heat exchangers.

26. As regards to the sources used to generate heat, the most commonly used sources in the Netherlands are drain water and residual heat – where the heat is obtained from electricity or waste incineration plants or from the heat released in industrial activity – accounting for over 80% of connected households in the Netherlands as of 2018. Other sources include biomass and aquifer thermal energy, accounting for about 13% and 5% of connected households in 2019, respectively.[10]

27. Risks of the heating companies can be broadly classified into one of four categories: demand risks, supply risks, buildout and take-up risks and regulatory risks.

[10] See Europe Economics, "WACC calculation for heat exchangers in The Netherlands," December 2019, page 4.

28. **Demand risks from existing customers**. Heating companies face the risk of revenue fluctuations related to fluctuations in demand. These risks relate to changes in number of consumers and in the quantity of heat demanded by connected consumers. Demand risks from existing customers, however, are relatively low, because customers connected to a heat network have limited capacity to switch to an alternative source without incurring significant costs. As a result, the turnover of existing customers is low.

29. **Buildout and take-up risks**. Similar to investments into a new fiber telecommunications network, the development of a heating network involves a certain degree of demand risks related to buildout and take-up of the heat network. Take-up risk relates to the risk that the rate at which homes connect to the heating networks differs from what is foreseen when the investment is made. Similarly, construction risks relate to the risk of higher costs or longer lead time during the construction period.

30. **Supply risks**. Heating companies face supply risks because they are fully responsible for the generation and supply of heat. The nature and extent of these risks varies by company based on the source(s) used to generate heat and on the degree of vertical integration. In general, supply risks relate to the availability of the sources used to produce heat, which cannot be changed (easily) in the short run, and to their price relative to the price of gas. Unlike regulated transport and distribution networks, the profitability of heat networks is highly sensitive to changes in the supply and relative price of the inputs used in the generation of heat.

31. **Regulatory risk**. In addition to general regulatory risks, heating companies also face potential asymmetric regulatory risk due to the combination of the "no more than usual" clause applied to the supply and metering tariffs,[11] and the "rate of return test", which ensures that realized returns of the heating companies do not exceed a reasonable level. Unlike demand, supply, buildout and take-up risks, which are mostly systematic risks, regulatory risks, including asymmetric risk, are mostly non-systematic. Therefore, it should not affect the beta of heating companies.[12]

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[11] As explained above, the "no more than usual" principle entails that consumers who rely on a heating company for their heat demand shall pay no more than consumers using gas.

[12] Companies, however, make investment decisions taking non-systematic asymmetric risk into account in developing expected cash flows. In practice, however, adjusting expected cash flows for non-systematic

Based on the above description of the activities and risks of heating companies we have identified four comparable sectors that can be used to estimate the beta of heating companies: power generation, networks, utilities and telecom companies.

32. **Power generation companies** derive much of their revenues from sales in liberalized power markets. Power generation companies thus face competition from other power plants, including renewable power sources, and have significant demand and supply risks. Similar to power generation companies, heating companies are highly sensitive to changes in the supply of the inputs used in heat generation and in particular to changes in price. Heating companies also face demand risks, but at a much lower level, because the turnover of homes connected to the heat network is limited.

33. Similar to energy **networks**, heating companies develop and operate a monopolistic network at regulated prices with limited customer turnover. Operation of the heat network is thus comparable to the operation of an energy network. **Utilities** are also good comparators. Similar to heating companies, utilities provide essential services to consumers at regulated prices, generally operating as natural monopolies and facing similar risk exposure. Finally, **telecom operators**, and particularly investments in new generation fiber networks, experience similar risks as the heating companies, particularly with respect to buildout and take-up risks.

34. Based on the above considerations, we estimate the beta for the heating sector based on the asset betas of four comparator groups:

    a. Power generation companies;

    b. Networks;

    c. Utilities; and

    d. Telecom companies.

35. Ideally, we would estimate the asset beta for the heating sector using a weighted average across sectors, using data about the relative contribution of different activities and risks to

asymmetric risk may be challenging. Determining whether there should be compensation in the WACC for asymmetric risk is outside the scope of this report.

the profitability of heating companies. However, this data is not available to us. Hence, we take a simple average of the median asset betas across the four sectors.

36. Taking the average across sectors – as opposed to taking the average across all peers in the four sectors -- ensures that the weight of each sector does not depend on the number of peer companies in each sector. For example, as we set out in section V.A, we have about 18 power generation companies and only six energy networks. Taking the average beta across all peers would give about three times as much weight to the power generation sector relative to the energy networks sector, simply because there are more suitable peers for the power generation sector. But this weighting would not reflect the actual contribution of each activity to the systematic risks of the heating sector.

# III. The Risk-Free Rate

37. The ACM methodology calculates the risk-free rate as the average yield on 20-year government bonds over the last three years in the Netherlands and in Germany.[13] Figure 1 illustrates the evolution of the yields of 20-year government bonds over the past 10 years in the Netherlands and in Germany. As a measure of the yield of 20-year government bonds, we rely on the 'GTDEM20Y Govt Generic Germany 20 Year Government Bond' index for Germany and the 'GTNLG20Y Govt Generic Netherlands 20 Year Government Bond' index for the Netherlands.

38. Nominal government bond yields in the Netherlands have been steadily decreasing through 2019, entering for the first time into negative territory around June of 2019. After that, bond yields fluctuated around zero through the end of 2021, when they started to increase, largely driven by higher energy prices and, relatedly, an exceptionally high rate of inflation. The increase in bond yields was further accelerated by the ECB announcements that it would raise interest rates for the first time since 2011. As of December 2022, bond yields have reached again the level they had in 2013, that is before the European Central Bank (ECB) launched its first Quantitative Easing (QE) stimulus program.

39. In Table 3, below, we calculate the applicable risk-free rate for each relevant WACC period by taking the three-year average yield of Dutch and German 20-year government bonds as of each of the measurement dates.

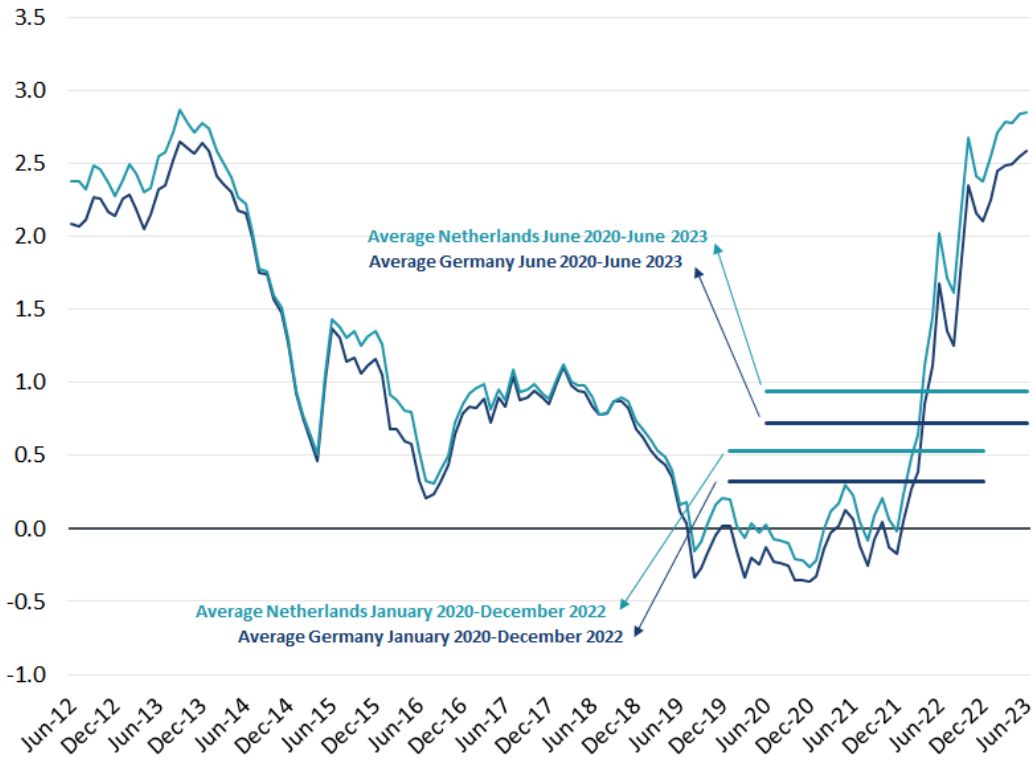
40. Over the three-year period ending on 31 December 2022, yields were 0.53% on average in the Netherlands, and 0.32% on average in Germany; taking the average between the two gives us a risk-free rate of 0.43%, which we apply to the 2023 WACC. We note, however, that a July 2023 ruling by the CBb in the appeals to the ACM method decisions for the energy network operators for 2022-2026, has determined that the ACM should apply a lower bound

[13] Historically, the ACM calculated the RFR by reference to 10-year government bonds. However, the ACM recently determined to use 20-year bonds to ensure consistency between the maturity of the bonds used in the calculation of the risk-free rate and the maturity of the bonds considered in the calculation of the equity risk premium. As we explain below, we base our estimate of the ERP on historical excess returns over long-term bonds calculated by Dimson, Marsh and Staunton (DMS). On average, the long-term bonds DMS use have a maturity of about 20-years.

of 0.5% to the nominal risk-free rate estimated using government bond yields affected by QE. The ACM may ultimately decide to apply this lower bound to the risk-free rate of the heating companies as well.

41. Over the three-year period ending in 15 June 2023, yields were 0.94 in the Netherlands, and 0.72 in Germany; taking the average between the two gives us a risk-free rate of 0.83 which we apply to the 2024-2025 WACC.

**FIGURE 1: DUTCH AND GERMAN 20-YEAR GOVERNMENT BOND YIELDS (JUNE 2012-JUNE 2023)**




Source: Bloomberg.

**TABLE 3: RISK-FREE RATE FOR THE HEATING COMPANIES, BY YEAR**

| | | Germany | Netherlands | Average |
|---|---|---|---|---|
| | | [A] See Note | [B] See Note | [C] Mean([A]-[B]) |
| **Relevant WACC Period** | | | | |
| 2023 | [1] | 0.32 | 0.53 | 0.43 |
| 2024-2025 | [2] | 0.72 | 0.94 | 0.83 |

Source: Bloomberg. Notes:
[1]: Average yield over the period 1 January 2020-31 December 2022.
[2]: Average yield over the period 16 June 2020-15 June 2023.

# IV. The Equity Risk Premium

42. 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 average 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.[14] 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.

43. Table 4, 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 2023 DMS report.[15] This report contains ERP estimates using data up to and including 2022. Table 4 shows the simple and weighted averages of the ERP countries for which DMS have data. Overall, we find that the simple average between the arithmetic and geometric ERP for the period 1900 to 2022 inclusive was 5.79% for the Eurozone. The weighted average, weighted using the current capitalization of each country's stock market, was 5.20%.

**TABLE 4: HISTORIC EQUITY RISK PREMIUM RELATIVE TO BONDS (1900 – 2022)**

| | | Risk premiums relative to bonds, 1900 - 2022 | | | |
|---|---|---|---|---|---|
| | | Geometric mean | Arithmetic mean | Average | Country Market Cap (2022) |
| | | % | % | % | USD mln |
| | | [A] | [B] | Average [A], [B] | [C] |
| Austria | [1] | 3.20 | 20.60 | 11.90 | 136,061 |
| Belgium | [2] | 2.60 | 4.70 | 3.65 | 375,680 |
| Finland | [3] | 5.70 | 9.20 | 7.45 | 271,278 |

[14] 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.

[15] Credit Suisse Global Investment Returns Sourcebook 2023, Table 9.

| | | | | | |
|---|---|---|---|---|---|
| France | [4] | 3.40 | 5.70 | 4.55 | 2,875,481 |
| Germany | [5] | 5.10 | 8.10 | 6.60 | 2,130,226 |
| Ireland | [6] | 2.90 | 4.90 | 3.90 | 100,877 |
| Italy | [7] | 3.20 | 6.50 | 4.85 | 566,304 |
| Netherlands | [8] | 3.60 | 5.90 | 4.75 | 899,646 |
| Portugal | [9] | 5.40 | 9.50 | 7.45 | 84,832 |
| Spain | [10] | 1.80 | 3.80 | 2.80 | 618,225 |
| Average Eurozone | [11] | 3.69 | 7.89 | 5.79 | |
| Value-weighted average Eurozone | [12] | 3.79 | 6.62 | 5.20 | |

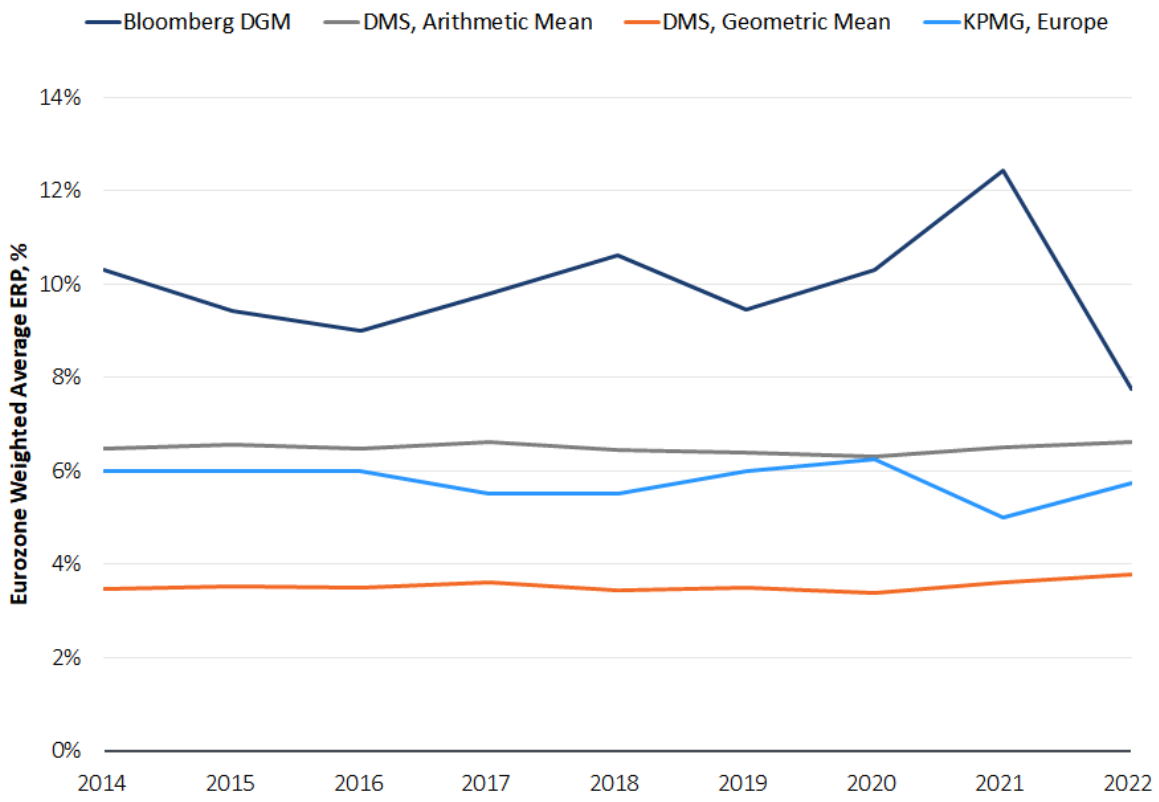
Sources and notes:
[A][1]-[10], [B][1]-[10]: Elroy Dimson, Paul Marsh and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2023, Table 11.
[C]: Bloomberg.
[11]: Average of [1]-[10].
[12]: Average of [1]-[10], weighted by [C].

44. ACM's methodology requires us to look at evidence on the ERP from the dividend growth model (DGM) as a 'sanity check' on the ERP estimate based on historical data.[16] 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 since 2014.[17] Both the arithmetic and geometric means based on the historical DMS data and the DGM estimates of the ERP by Bloomberg and KPMG have been relatively stable over the last ten years. Over the past two years, we further observe the two DGM estimates going in opposite directions, with Bloomberg's estimate increasing from 10.29% in 2020 to 12.43% in 2021 and then decreasing to 7.74% in 2022, and KPMG's estimate decreasing from 6.25% in 2020 to 5.0% in 2021 and then increasing again to 5.75% in 2022. Overall, we find this evidence to suggest that no adjustment is necessary or justified.

[16] For example, after the 2009 financial crisis, historical data indicated a decrease in the ERP, because realised returns of stocks over bonds were very low. But the DGM indicated that the ERP had if anything increased after the crisis. The DGM result made sense, since investors would likely have perceived more risk and demanded higher returns immediately after the crisis. Hence, the results of the DGM indicated that, for this period, a downward reduction in the ERP was not justified, even though this is what the unadjusted historical data indicated.

[17] 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, 30 March 2023. 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..

45. In Table 5, below, we further report the average of the geometric and arithmetic average DMS ERP for the Eurozone weighted by stock market capitalisation for each of the years 2018-2022 inclusive. The weighted average of the geometric and arithmetic means of the ERP for the Eurozone ranged between 4.85% and 5.20%, averaging 5.0% over this five-year period. Based on this evidence, we find that an ERP of 5.0% seems reasonable for the entire period. Selecting a stable ERP of 5.0% is also consistent with the most recent ACM decisions on the WACC for the rental of heat exchangers and for gas and electricity networks in the Netherlands.

TABLE 5: DMS ERP DATA 2018 - 2022

| | Geometric Mean | Arithmetic Mean | Average |
|---|---|---|---|
| | [A] | [B] | [C] |
| | % | % | Average([A], [B]) |
| 2018 | 3.45 | 6.46 | 4.95 |
| 2019 | 3.50 | 6.40 | 4.95 |
| 2020 | 3.38 | 6.31 | 4.85 |
| 2021 | 3.60 | 6.51 | 5.06 |
| 2022 | 3.79 | 6.62 | 5.20 |

| | | | |
|---|---|---|---|
| Average | 3.54 | 6.46 | 5.00 |

Sources and notes: Brattle calculation using data from Credit Suisse Global Investment Returns Sourcebook, 2018-2023.
[A], [B]: Value-weighted average for the Eurozone.

# V. Selection of the Peer Groups and Screening Tests

## A. Potential Peers

46. As explained in Section I, above, we have identified four comparable sectors to estimate the beta for the heating sector in general, namely power generation companies, energy networks, utilities and telecom companies.

47. In this report, we start considering the same candidate peers we considered in the 2022 Brattle report, which were selected by reference to prior ACM determinations in the utilities, telecoms, and energy sectors.[18] From this broad list, we exclude companies that are no longer listed.[19] For telecom operators specifically, because the buildout and take-up risk of heating companies is more similar to an investment in a new fiber network whereas the risk of a legacy copper network is lower, we further exclude incumbent operators – former state monopolists that own the legacy copper network in at least one of the countries in which they operate – and consider only alternative telecom operators who own a fixed

[18] See Dan Harris and Lucrezio Figurelli, "The WACC for Heating Companies and Heat Exchangers in the Netherlands", draft of 9 July 2022, Section V (available at: https://www.acm.nl/nl/publicaties/consultatie-adviesrapport-wacc-rendementstoets-en-afleversets). See also, Europe Economics, "WACC calculation for heat exchangers in The Netherlands," December 2019; Dan Harris, Lucrezio Figurelli and Massimiliano Cologgi, "The WACC for KPN and VodafoneZiggo", 27 February 2020 (available at https://www.acm.nl/sites/default/files/documents/2020-03/onderzoek-naar-de-vermogenskostenvoet-van-kpn-en-vodafoneziggo_1.pdf); Dan Harris and Lucrezio Figurelli, "The WACC for the Dutch Electricity TSO and Electricity and Gas DSOs", 7 April 2021; (available at https://www.acm.nl/sites/default/files/documents/the-wacc-for-the-dutch-electricity-tso-and-electricity-and-gas-dsos.pdf); Dan Harris, Lucrezio Figurelli, Federico Guatri and Filippo Nezzo, "The WACC for Drinking Water Companies in the Netherlands", 9 August 2021 (available at https://www.acm.nl/sites/default/files/documents/the-wacc-for-drinking-water-companies-in-the-netherlands-2022-2023-2024.pdf); Dan Harris, Lucrezio Figurelli, Federico Guatri and Filippo Nezzo, "The WACC for Electricity and Water Companies in the Caribbean Netherlands for the years 2023-2025", 10 May 2022 (available at https://www.acm.nl/sites/default/files/documents/rapport-brattle-the-wacc-for-electricity-and-water-companies-in-the-caribbean-netherlands-for-the-years-2023-2025.pdf).

[19] In particular, we exclude from the initial list of candidate peers Albioma SA and Falck Renewables SpA because they were delisted in October 2022 and May 2022, respectively. See https://www.albioma.com/wp-content/uploads/2022/09/Press-release-relating-to-the-squeeze-out-procedure-for-the-shares-and-warrants-of-Albioma.pdf and https://finanza.lastampa.it/News/2022/04/11/falck-renewables-al-via-lopa-per-il-delisting/MTFfMjAyMi0wNC0xMV9UTEI.

telecommunication network competing with that of the incumbent. After applying these criteria, we end up with a list of 121 candidate peers of which 41 power generation companies, 6 are energy networks, 57 are utilities companies and 17 are telecom operators.

## B. Liquidity Tests

48. Illiquid stocks tend to underestimate the true industry beta.[20] Hence, for each of the potential peers in the initial sample, we test to see if the firms' shares are sufficiently liquid.

49. 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. More recently, in response to a court ruling,[21] 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.[22] The ACM has asked us to follow this recommendation, and to consider additional liquidity tests as 'sanity checks' on the results. We find this to be a reasonable approach to test for liquidity.

50. In line with the ACM methodology, for each candidate peer we calculate the average bid-ask spread as a percentage of the stock price and exclude companies with an average bid-ask

[20] 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 has other disadvantages, such as providing 80% less data points over any given period.

[21] 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.

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

spread exceeding 1% of the stock price over the relevant three-year reference period for the calculation of beta. We further exclude candidate peers with annual revenues below € 100 million and whose shares were traded on less than 90% of the days in which the relevant market index traded over the relevant reference period.[23]

51. We consider two additional screening test to ensure a reliable beta estimate. Specifically, we check that the credit rating of the candidate peers is not below investment grade and that the companies were not involved in substantial M&A activity. 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 heating companies. Similarly, 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 would 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.[24]

52. We apply all the above tests separately for each relevant WACC period, so that the candidate peers excluded and the final sample of peers vary depending on the period considered. Table 19, Table 20, Table 21 and Table 22 in Appendix A.I summarize the results of the screening tests by relevant WACC period. Appendix A.II provides additional detail on the companies excluded due to substantial M&A transactions.

[23] In general, the annual revenue requirement and number of trading days test lead to the exclusion of very few additional peers relative to using only the bid-ask spread. This is because most illiquid stocks are captured through the bid-ask spread. However, in some cases, companies may exhibit a low bid-ask spread because they show a zero bid-ask spread for days in which they are not traded. Also, firms with low revenues may be relatively less liquid than larger stocks even though they satisfy the bid-ask spread criterion. Hence, application of these additional criteria is helpful to avoid erroneously including stocks that have a low bid-ask spread but are effectively illiquid or relatively less liquid than larger stocks.

[24] 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.

# C. The Final Peer Groups

53. Table 6, Table 7, Table 8 and Table 9 below, provide a summary of the final peer groups by relevant WACC period. Overall, the final sample of peers includes 18 power generation companies, 6 energy networks, 16 utilities and 8 alternative telecom operators.

**TABLE 6: THE FINAL SAMPLE OF PEERS, POWER GENERATION, BY YEAR**

| | | Included in final peers | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| A2A SpA | Italy | ✓ | ✓ |
| Drax Group PLC | Britain | ✓ | ✓ |
| Edison SpA | Italy | ✓ | ✓ |
| EDP Renovaveis SA | Spain | ✓ | ✓ |
| Electricite de France SA | France | ✓ | ✓ |
| Encavis AG | Germany | ✓ | ✓ |
| Endesa SA | Spain | ✓ | ✓ |
| Energiekontor AG | Germany | ✓ | ✓ |
| Engie SA | France | ✓ | ✓ |
| ERG SpA | Italy | ✓ | ✓ |
| Iberdrola SA | Spain | ✓ | ✓ |
| OMV AG | Austria | ✓ | ✓ |
| Orsted AS | Denmark | ✓ | ✓ |
| RWE AG | Germany | ✓ | ✓ |
| Scatec ASA | Norway | ✓ | ✓ |
| SSE PLC | Britain | ✓ | ✓ |
| Verbund AG | Austria | ✓ | ✓ |
| Voltalia SA | France | ✓ | ✓ |
| Total | | 18 | 18 |

Source: Brattle analysis of Bloomberg data.

**TABLE 7: THE FINAL SAMPLE OF PEERS, NETWORKS, BY YEAR**

| | | Included in final peers | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| Elia Group SA/NV | Belgium | ✓ | ✓ |
| Enagas SA | Spain | ✓ | ✓ |
| Red Electrica Corp SA | Spain | ✓ | ✓ |
| REN - Redes Energeticas Nacion | Portugal | ✓ | ✓ |
| Snam SpA | Italy | ✓ | ✓ |
| Terna - Rete Elettrica Naziona | Italy | ✓ | ✓ |
| Total | | 6 | 6 |

Source: Brattle analysis of Bloomberg data.

**TABLE 8: THE FINAL SAMPLE OF PEERS, UTILITIES, BY YEAR**

| | | Included in final peers | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| ACEA SpA | Italy | ✓ | ✓ |
| Ascopiave SpA | Italy | ✓ | ✓ |
| Athens Water Supply & Sewage C | Greece | ✓ | ✓ |
| Audax Renovables SA | Spain | ✓ | ✓ |
| BKW AG | Switzerland | ✓ | ✓ |
| Centrica PLC | Britain | ✓ | ✓ |
| Elmera Group ASA | Norway | ✓ | ✓ |
| Enel SpA | Italy | ✓ | ✓ |
| Energiedienst Holding AG | Switzerland | ✓ | ✓ |
| EVN AG | Austria | ✓ | ✓ |
| Hera SpA | Italy | ✓ | ✓ |
| Iren SpA | Italy | ✓ | ✓ |
| Italgas SpA | Italy | ✓ | ✓ |
| Pennon Group PLC | Britain | ✓ | ✓ |
| Severn Trent PLC | Britain | ✓ | ✓ |
| United Utilities Group PLC | Britain | ✓ | ✓ |
| Total | | 16 | 16 |

Source: Brattle analysis of Bloomberg data.

**TABLE 9: THE FINAL SAMPLE OF PEERS, TELECOM OPERATORS, BY YEAR**

| | | Included in final peers | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| Bouygues SA | France | ✓ | ✓ |
| Gamma Communications PLC | Britain | ✓ | ✓ |
| NOS SGPS SA | Portugal | ✓ | ✓ |
| Orange Belgium SA | Belgium | ✓ | ✓ |
| Tele2 AB | Sweden | ✓ | ✓ |
| Telefonica Deutschland Holding | Germany | ✓ | ✓ |
| United Internet AG | Germany | ✓ | ✓ |
| Vodafone Group PLC | Britain | ✓ | ✓ |
| Total | | 8 | 8 |

Source: Brattle analysis of Bloomberg data.

# VI. Beta

## A. Peer Groups 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 [25] on market returns over sample periods of three years as of the relevant measurement dates for the 2023 WACC and for the 2024-2025 WACC.[26]

55. The systematic 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 heating company would likely diversify its portfolio within a single currency zone so as to avoid exchange rate risk. 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. Accordingly, to calculate market returns we use a broad Eurozone index for companies operating in the Eurozone (the Stoxx Europe 600 (SXXP)) and the FTSE All-Share index (ASX Index) for UK companies Drax Group PLC, SSE PLC, Pennon Group PLC, Severn Trent PLC, United Utilities Group PLC, Gamma Communications PLC and Vodafone Group PLC.

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 test, but rely on the OLS estimate of the beta parameter even in the

[25] We measure daily returns based on dividend adjusted prices using Bloomberg's "TOT_RETURN_INDEX_GROSS_DVDS" function. This function returns stock prices adjusted to account for the issuance of dividends, gross of any applicable withholding tax. We note that Bloomberg also provides dividend adjusted prices *net* of any applicable withholding tax, also known as "cash dividends". The two fields, however, will only be different if there is tax rate information. In practice, these two measures tend to be the same for most firms. Moreover, dividend withholding taxes are not taxes to the firm, but rather taxes to the income – the dividend – of the shareholders, which governments may decide to tax directly at the source, and may differ significantly by shareholder type (individual or firm, tax resident or non-resident).

[26] As mentioned above, we use the three-year period 1 January 2020-31 December 2022 as our estimation window for the 2023 WACC and the three-year period 16 June 2020-15 June 2023 for the 2024-2025 WACC.

presence of autocorrelation.[27] 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, we apply a test for market imperfections. This test 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. If the market is perfectly efficient, all information should be dealt with on the same day. The test for market imperfections requires to regress a company's daily returns using the market index returns one day before and one day after as additional regressors. If the lag or the lead coefficients 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 is addressed using weekly data to estimate the equity beta.

59. We have performed this test for the firms in our peer groups. The test is significant for six and five firms out of the total sample for the 2023 and 2024-2025 periods respectively. Hence for these firms we take the weekly beta.[28] For the remaining firms we take the daily beta. Table

---

[27] 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.

[28] For 2023 the weekly beta was higher than the daily beta for most of the companies. In particular: the weekly beta of A2A SpA (1.22) compares to a daily beta of 1.05; the weekly beta of Drax Group PLC (1.24) compares to a daily beta of 0.86; the weekly beta of Energiekontor AG (0.89) compares to a daily beta of 0.54; the weekly beta of Engie SA (1.29) compares to a daily beta of 1.05; the weekly beta of SSE PLC (1.03) compares to a daily beta of 1.01; the weekly beta of Orange Belgium SA (0.63) compares to a daily beta of 0.32. Also for 2024-2025 the weekly beta was mostly higher than the daily beta for most of the companies. In particular: the weekly of Engie SA (1.15) compares to a daily beta of 0.95; the weekly beta of ERG SpA (0.77) compares to a daily beta of 0.67; the weekly beta of OMV AG (1.36) compares to a daily beta of 1.27; the weekly of Snam SpA (0.54) compares to a daily beta of 0.65; the weekly beta of Orange Belgium SA (0.31) compares to a daily beta of 0.20.

10 reports the equity betas of the peers for the 2023 WACC. Overall, the equity betas range between 0.62 (Edison SpA) and 1.46 (OMV AG) for power generation, between 0.39 (Elia Group SA/NV) and 0.82 (Snam SpA) for networks, between 0.24 (Energiedienst Holding AG) and 1.22 (Centrica PLC) for utilities, and between 0.49 (Gamma Communications PLC) and 1.19 (Bouygues SA) for telecom operators.

**TABLE 10: EQUITY BETAS FOR THE 2023 WACC**

| | Results | | Beta Chosen |
|---|---|---|---|
| | Beta | Robust Standard Error | |
| | [A] | [B] | [C] |
| **Power Generation** | | | |
| A2A SpA | 1.22 | 0.08 | Weekly |
| Drax Group PLC | 1.24 | 0.16 | Weekly |
| Edison SpA | 0.62 | 0.04 | Daily |
| EDP Renovaveis SA | 0.77 | 0.06 | Daily |
| Electricite de France SA | 1.05 | 0.06 | Daily |
| Encavis AG | 1.00 | 0.07 | Daily |
| Endesa SA | 0.81 | 0.04 | Daily |
| Energiekontor AG | 0.89 | 0.14 | Weekly |
| Engie SA | 1.29 | 0.09 | Weekly |
| ERG SpA | 0.82 | 0.05 | Daily |
| Iberdrola SA | 0.81 | 0.04 | Daily |
| OMV AG | 1.46 | 0.06 | Daily |
| Orsted AS | 0.68 | 0.06 | Daily |
| RWE AG | 0.93 | 0.05 | Daily |
| Scatec ASA | 1.06 | 0.09 | Daily |
| SSE PLC | 1.03 | 0.09 | Weekly |
| Verbund AG | 0.98 | 0.07 | Daily |
| Voltalia SA | 0.74 | 0.07 | Daily |
| **Networks** | | | |
| Elia Group SA/NV | 0.39 | 0.04 | Daily |
| Enagas SA | 0.62 | 0.04 | Daily |
| Red Electrica Corp SA | 0.49 | 0.04 | Daily |
| REN - Redes Energeticas Nacion | 0.44 | 0.03 | Daily |
| Snam SpA | 0.82 | 0.04 | Daily |
| Terna - Rete Elettrica Naziona | 0.73 | 0.04 | Daily |
| **Utilities** | | | |
| ACEA SpA | 0.76 | 0.04 | Daily |
| Ascopiave SpA | 0.71 | 0.05 | Daily |
| Athens Water Supply & Sewage C | 0.58 | 0.05 | Daily |
| Audax Renovables SA | 0.94 | 0.08 | Daily |

| | | | |
|---|---|---|---|
| BKW AG | 0.61 | 0.04 | Daily |
| Centrica PLC | 1.22 | 0.07 | Daily |
| Elmera Group ASA | 0.67 | 0.08 | Daily |
| Enel SpA | 1.04 | 0.04 | Daily |
| Energiedienst Holding AG | 0.24 | 0.05 | Daily |
| EVN AG | 0.85 | 0.05 | Daily |
| Hera SpA | 0.91 | 0.04 | Daily |
| Iren SpA | 0.87 | 0.04 | Daily |
| Italgas SpA | 0.77 | 0.04 | Daily |
| Pennon Group PLC | 0.52 | 0.05 | Daily |
| Severn Trent PLC | 0.53 | 0.04 | Daily |
| United Utilities Group PLC | 0.56 | 0.04 | Daily |
| **Telecom Operators** | | | |
| Bouygues SA | 1.19 | 0.04 | Daily |
| Gamma Communications PLC | 0.49 | 0.06 | Daily |
| NOS SGPS SA | 0.57 | 0.04 | Daily |
| Orange Belgium SA | 0.63 | 0.10 | Weekly |
| Tele2 AB | 0.57 | 0.04 | Daily |
| Telefonica Deutschland Holding | 0.53 | 0.04 | Daily |
| United Internet AG | 0.83 | 0.05 | Daily |
| Vodafone Group PLC | 0.90 | 0.04 | Daily |

Source: Brattle analysis of Bloomberg data.

60. Table 11 reports the equity betas of the peers for the 2024-2025 WACC. Overall, the equity betas range between 0.56 (Edison SpA) and 1.36 (OMV AG) for power generation, between 0.25 (REN – Redes Energeticas Nacionais) and 0.60 (Terna – Rete Elettrica Nazionale) for networks, between 0.17 (Energiedienst Holding AG) and 1.05 (Enel SpA) for utilities, and between 0.31 (Orange Belgium PLC) and 0.94 (United Internet AG) for telecom operators.

**TABLE 11: EQUITY BETAS FOR THE 2024-2025 WACC**

| | Results | | |
|---|---|---|---|
| | Beta | Robust Standard Error | Beta Chosen |
| | [A] | [B] | [C] |
| **Power Generation** | | | |
| A2A SpA | 1.00 | 0.05 | Daily |
| Drax Group PLC | 0.74 | 0.08 | Daily |
| Edison SpA | 0.56 | 0.05 | Daily |
| EDP Renovaveis SA | 0.75 | 0.07 | Daily |
| Electricite de France SA | 0.83 | 0.07 | Daily |
| Encavis AG | 0.91 | 0.09 | Daily |
| Endesa SA | 0.68 | 0.05 | Daily |
| Energiekontor AG | 0.90 | 0.09 | Daily |

| | | | | |
|---|---|---|---|---|
| | Engie SA | 1.15 | 0.13 | Weekly |
| | ERG SpA | 0.77 | 0.14 | Weekly |
| | Iberdrola SA | 0.68 | 0.04 | Daily |
| | OMV AG | 1.36 | 0.17 | Weekly |
| | Orsted AS | 0.71 | 0.08 | Daily |
| | RWE AG | 0.75 | 0.06 | Daily |
| | Scatec ASA | 1.19 | 0.11 | Daily |
| | SSE PLC | 0.77 | 0.05 | Daily |
| | Verbund AG | 0.82 | 0.08 | Daily |
| | Voltalia SA | 0.71 | 0.09 | Daily |
| **Networks** | | | | |
| | Elia Group SA/NV | 0.31 | 0.04 | Daily |
| | Enagas SA | 0.47 | 0.04 | Daily |
| | Red Electrica Corp SA | 0.40 | 0.04 | Daily |
| | REN - Redes Energeticas Nacion | 0.25 | 0.03 | Daily |
| | Snam SpA | 0.54 | 0.08 | Weekly |
| | Terna - Rete Elettrica Naziona | 0.60 | 0.04 | Daily |
| **Utilities** | | | | |
| | ACEA SpA | 0.67 | 0.05 | Daily |
| | Ascopiave SpA | 0.67 | 0.05 | Daily |
| | Athens Water Supply & Sewage C | 0.48 | 0.05 | Daily |
| | Audax Renovables SA | 0.75 | 0.10 | Daily |
| | BKW AG | 0.57 | 0.05 | Daily |
| | Centrica PLC | 0.97 | 0.07 | Daily |
| | Elmera Group ASA | 0.68 | 0.11 | Daily |
| | Enel SpA | 1.05 | 0.04 | Daily |
| | Energiedienst Holding AG | 0.17 | 0.06 | Daily |
| | EVN AG | 0.86 | 0.06 | Daily |
| | Hera SpA | 0.90 | 0.05 | Daily |
| | Iren SpA | 0.87 | 0.05 | Daily |
| | Italgas SpA | 0.75 | 0.04 | Daily |
| | Pennon Group PLC | 0.54 | 0.06 | Daily |
| | Severn Trent PLC | 0.49 | 0.05 | Daily |
| | United Utilities Group PLC | 0.53 | 0.05 | Daily |
| **Telecom Operators** | | | | |
| | Bouygues SA | 0.85 | 0.04 | Daily |
| | Gamma Communications PLC | 0.55 | 0.07 | Daily |
| | NOS SGPS SA | 0.47 | 0.05 | Daily |
| | Orange Belgium SA | 0.31 | 0.14 | Weekly |
| | Tele2 AB | 0.48 | 0.05 | Daily |
| | Telefonica Deutschland Holding | 0.45 | 0.05 | Daily |
| | United Internet AG | 0.94 | 0.06 | Daily |
| | Vodafone Group PLC | 0.89 | 0.05 | Daily |

Source: Brattle analysis of Bloomberg data

# B. Peer Groups Gearing and Asset Betas

61. 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.

62. 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.[29]

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

64. Table 12 reports the equity beta, the gearing and the resulting asset betas for each firm for the 2023 WACC. Overall, we find that:

    a. Power generation: the asset betas range between 0.53 (Iberdrola SA) and 1.17 (OMV AG), with a median asset beta of 0.68.

    b. Networks: the asset betas range between 0.20 (REN - Redes Energeticas Nacionais) and 0.50 (Snam SpA), with a median asset beta of 0.35.

    c. Utilities: the asset betas range between 0.20 (Energiedienst Holding AG) and 0.80 (Centrica PLC), with a median asset beta of 0.53.

    d. Telecom operators: the asset betas range between 0.35 (NOS SGPS SA) and 0.91 (Bouygues SA), with a median asset beta of 0.47.

[29] 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 12: EQUITY AND ASSET BETA FOR THE 2023 WACC**

| | | | 2023 | | | |
|---|---|---|---|---|---|---|
| | | | Equity Beta [A] | Gearing (D/E) [B] | Tax Rate [C] | Asset Beta [D] |
| **Power Generation** | | | | | | |
| A2A SpA | Italy | | 1.22 | 86.0% | 24.0% | 0.74 |
| Drax Group PLC | United Kingdom | | 1.24 | 61.2% | 19.0% | 0.83 |
| Edison SpA | Italy | | 0.62 | 7.3% | 24.0% | 0.59 |
| EDP Renovaveis SA | Spain | | 0.77 | 26.4% | 25.0% | 0.65 |
| Electricite de France SA | France | | 1.05 | 116.2% | 26.5% | 0.56 |
| Encavis AG | France | | 1.00 | 68.7% | 26.5% | 0.66 |
| Endesa SA | Spain | | 0.81 | 34.0% | 25.0% | 0.65 |
| Energiekontor AG | Germany | | 0.89 | 28.3% | 30.0% | 0.74 |
| Engie SA | France | | 1.29 | 82.2% | 26.5% | 0.80 |
| ERG SpA | Italy | | 0.82 | 42.6% | 24.0% | 0.62 |
| Iberdrola SA | Spain | | 0.81 | 68.8% | 25.0% | 0.53 |
| OMV AG | Austria | | 1.46 | 32.8% | 25.0% | 1.17 |
| Orsted AS | Denmark | | 0.68 | 7.1% | 22.0% | 0.65 |
| RWE AG | Germany | | 0.93 | 13.4% | 30.0% | 0.85 |
| Scatec ASA | Norway | | 1.06 | 47.5% | 22.0% | 0.77 |
| SSE PLC | United Kingdom | | 1.03 | 56.7% | 19.0% | 0.70 |
| Verbund AG | Austria | | 0.98 | 8.6% | 25.0% | 0.92 |
| Voltalia SA | France | | 0.74 | 35.4% | 26.5% | 0.59 |
| Median | | [1] | 0.96 | 39.0% | | 0.68 |
| **Networks** | | | | | | |
| Elia Group SA/NV | Belgium | | 0.39 | 78.9% | 26.3% | 0.25 |
| Enagas SA | Spain | | 0.62 | 80.7% | 25.0% | 0.39 |
| Red Electrica Corp SA | Spain | | 0.49 | 71.7% | 25.0% | 0.32 |
| REN - Redes Energeticas Nacion | Portugal | | 0.44 | 147.0% | 21.0% | 0.20 |
| Snam SpA | Italy | | 0.82 | 82.5% | 24.0% | 0.50 |
| Terna - Rete Elettrica Naziona | Italy | | 0.73 | 67.8% | 24.0% | 0.48 |
| Median | | [2] | 0.55 | 80% | | 0.35 |
| **Utilities** | | | | | | |
| ACEA SpA | Italy | | 0.76 | 92.8% | 24.0% | 0.44 |
| Ascopiave SpA | Italy | | 0.71 | 46.4% | 24.0% | 0.53 |
| Athens Water Supply & Sewage C | Greece | | 0.58 | 0.0% | 23.3% | 0.58 |
| Audax Renovables SA | Spain | | 0.94 | 50.9% | 25.0% | 0.68 |
| BKW AG | Switzerland | | 0.61 | 15.2% | 14.9% | 0.54 |
| Centrica PLC | United Kingdom | | 1.22 | 65.7% | 19.0% | 0.80 |
| Elmera Group ASA | Norway | | 0.67 | 13.7% | 22.0% | 0.60 |
| Enel SpA | Italy | | 1.04 | 86.4% | 24.0% | 0.63 |
| Energiedienst Holding AG | Switzerland | | 0.24 | 28.5% | 14.9% | 0.20 |
| EVN AG | Austria | | 0.85 | 22.8% | 25.0% | 0.73 |
| Hera SpA | Italy | | 0.91 | 74.6% | 24.0% | 0.58 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Iren SpA | Italy | | 0.87 | 113.9% | 24.0% | 0.47 |
| Italgas SpA | Italy | | 0.77 | 111.7% | 24.0% | 0.42 |
| Pennon Group PLC | United Kingdom | | 0.52 | 58.2% | 19.0% | 0.35 |
| Severn Trent PLC | United Kingdom | | 0.53 | 101.1% | 19.0% | 0.29 |
| United Utilities Group PLC | United Kingdom | | 0.56 | 116.5% | 19.0% | 0.29 |
| Median | | [3] | 0.73 | 62% | | 0.53 |
| **Telecom Operators** | | | | | | |
| Bouygues SA | France | | 1.19 | 40.3% | 26.5% | 0.91 |
| Gamma Communications PLC | United Kingdom | | 0.49 | 0.0% | 19.0% | 0.49 |
| NOS SGPS SA | Portugal | | 0.57 | 77.8% | 21.0% | 0.35 |
| Orange Belgium SA | Belgium | | 0.63 | 40.2% | 26.3% | 0.49 |
| Tele2 AB | Sweden | | 0.57 | 35.5% | 20.9% | 0.45 |
| Telefonica Deutschland Holding | Germany | | 0.53 | 57.9% | 30.0% | 0.38 |
| United Internet AG | Germany | | 0.83 | 29.2% | 30.0% | 0.69 |
| Vodafone Group PLC | United Kingdom | | 0.90 | 145.6% | 19.0% | 0.41 |
| Median | | [4] | 0.60 | 40.2% | | 0.47 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[D]: [A]/(1+(1-[C])*[B]).

65. Table 13 reports the equity beta, the gearing and the resulting asset betas for each firm for the 2024-2025 WACC. Overall, we find that:

a. Power generation: the asset betas range between 0.45 (Iberdrola SA) and 1.13 (OMV AG), with a median asset beta of 0.61.

b. Networks: the asset betas range between 0.12 (REN - Redes Energeticas Nacionais) and 0.40 (Terna – Rete Elettrica Nazionale), with a median asset beta of 0.28.

c. Utilities: the asset betas range between 0.14 (Energiedienst Holding AG) and 0.73 (EVN AG), with a median asset beta of 0.48.

d. Telecom operators: the asset betas range between 0.25 (Orange Belgium SA) and 0.74 (United Internet AG), with a median asset beta of 0.38.

**TABLE 13: EQUITY AND ASSET BETA FOR THE 2024-2025 WACC**

| | | 2024-2025 | | | |
|---|---|---|---|---|---|
| | | Equity Beta [A] | Gearing (D/E) [B] | Tax Rate [C] | Asset Beta [D] |
| **Power Generation** | | | | | |
| A2A SpA | Italy | 1.00 | 89.0% | 24.0% | 0.59 |
| Drax Group PLC | United Kingdom | 0.74 | 44.7% | 19.0% | 0.54 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Edison SpA | Italy | | 0.56 | 6.9% | 24.0% | 0.53 |
| EDP Renovaveis SA | Spain | | 0.75 | 25.7% | 25.0% | 0.63 |
| Electricite de France SA | France | | 0.83 | 92.2% | 26.1% | 0.49 |
| Encavis AG | France | | 0.91 | 62.5% | 26.1% | 0.62 |
| Endesa SA | Spain | | 0.68 | 37.2% | 25.0% | 0.53 |
| Energiekontor AG | Germany | | 0.90 | 22.3% | 30.0% | 0.77 |
| Engie SA | France | | 1.15 | 67.5% | 26.1% | 0.77 |
| ERG SpA | Italy | | 0.77 | 40.7% | 24.0% | 0.59 |
| Iberdrola SA | Spain | | 0.68 | 68.2% | 25.0% | 0.45 |
| OMV AG | Austria | | 1.36 | 28.1% | 25.0% | 1.13 |
| Orsted AS | Denmark | | 0.71 | 7.8% | 22.0% | 0.67 |
| RWE AG | Germany | | 0.75 | 12.7% | 30.0% | 0.69 |
| Scatec ASA | Norway | | 1.19 | 70.5% | 22.0% | 0.77 |
| SSE PLC | United Kingdom | | 0.77 | 52.8% | 19.0% | 0.54 |
| Verbund AG | Austria | | 0.82 | 9.0% | 25.0% | 0.77 |
| Voltalia SA | France | | 0.71 | 30.8% | 26.1% | 0.58 |
| Median | | [1] | 0.77 | 38.9% | | 0.61 |
| **Networks** | | | | | | |
| Elia Group SA/NV | Belgium | | 0.31 | 64.6% | 25.7% | 0.21 |
| Enagas SA | Spain | | 0.47 | 82.5% | 25.0% | 0.29 |
| Red Electrica Corp SA | Spain | | 0.40 | 70.0% | 25.0% | 0.26 |
| REN - Redes Energeticas Nacion | Portugal | | 0.25 | 138.1% | 21.0% | 0.12 |
| Snam SpA | Italy | | 0.54 | 80.9% | 24.0% | 0.34 |
| Terna - Rete Elettrica Naziona | Italy | | 0.60 | 65.5% | 24.0% | 0.40 |
| Median | | [2] | 0.44 | 75% | | 0.28 |
| **Utilities** | | | | | | |
| ACEA SpA | Italy | | 0.67 | 78.7% | 24.0% | 0.42 |
| Ascopiave SpA | Italy | | 0.67 | 53.4% | 24.0% | 0.48 |
| Athens Water Supply & Sewage C | Greece | | 0.48 | 0.0% | 23.0% | 0.48 |
| Audax Renovables SA | Spain | | 0.75 | 49.7% | 25.0% | 0.54 |
| BKW AG | Switzerland | | 0.57 | 12.8% | 14.9% | 0.51 |
| Centrica PLC | United Kingdom | | 0.97 | 43.0% | 19.0% | 0.72 |
| Elmera Group ASA | Norway | | 0.68 | 24.4% | 22.0% | 0.57 |
| Enel SpA | Italy | | 1.05 | 95.2% | 24.0% | 0.61 |
| Energiedienst Holding AG | Switzerland | | 0.17 | 28.5% | 14.9% | 0.14 |
| EVN AG | Austria | | 0.86 | 24.3% | 25.0% | 0.73 |
| Hera SpA | Italy | | 0.90 | 81.8% | 24.0% | 0.56 |
| Iren SpA | Italy | | 0.87 | 123.2% | 24.0% | 0.45 |
| Italgas SpA | Italy | | 0.75 | 116.3% | 24.0% | 0.40 |
| Pennon Group PLC | United Kingdom | | 0.54 | 68.3% | 19.0% | 0.35 |
| Severn Trent PLC | United Kingdom | | 0.49 | 99.2% | 19.0% | 0.27 |
| United Utilities Group PLC | United Kingdom | | 0.53 | 114.1% | 19.0% | 0.28 |
| Median | | [3] | 0.68 | 61% | | 0.48 |
| **Telecom Operators** | | | | | | |
| Bouygues SA | France | | 0.85 | 48.2% | 26.1% | 0.63 |
| Gamma Communications PLC | United Kingdom | | 0.55 | 0.0% | 19.0% | 0.55 |

| | | | | | | |
|---|---|---|---|---|---|---|
| NOS SGPS SA | Portugal | | 0.47 | 77.4% | 21.0% | 0.29 |
| Orange Belgium SA | Belgium | | 0.31 | 31.3% | 25.7% | 0.25 |
| Tele2 AB | Sweden | | 0.48 | 37.7% | 20.7% | 0.37 |
| Telefonica Deutschland Holding | Germany | | 0.45 | 56.8% | 30.0% | 0.32 |
| United Internet AG | Germany | | 0.94 | 38.7% | 30.0% | 0.74 |
| Vodafone Group PLC | United Kingdom | | 0.89 | 157.9% | 19.0% | 0.39 |
| Median | | [4] | 0.52 | 43.5% | | 0.38 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[D]: [A]/(1+(1-[C])*[B]).

# C. Asset Beta for the Heating Companies

66. As explained above, we calculate the asset beta for the heating sector by taking the average of the median asset betas of the four comparable groups, namely power generation and renewables, networks, utilities and telecoms operators.

67. Table 14 summarizes the results. Overall, the average of the median asset betas of the four comparable sectors declines from 0.51 for the 2023 measurement period (ending 31 December 2022) to 0.44 for the 2024-2025 measurement period (ending 15 June 2023). We have investigated the reasons for the decline beta, which is observable for all four comparable sectors. It seems that the main reason for the decline is that, at the beginning of the Covid-19 pandemic around early March 2020 and the beginning of wide scale lockdowns (the 'Covid Event'), there was a jump in beta values as the returns of the comparable sectors and the return on the market indices decreased sharply, and in a more coordinated manner than would have been predicted prior to the outbreak of Covid-19. The inclusion of the Covid Event in the estimation window led relatively elevated beta values. However, by June 2023 the Covid event has dropped out of the three year estimation window, leading to a fall in betas. It could also be that the war in Ukraine, which had a disproportionate effect on share prices and returns for the energy sectors, also put downward pressure on beta.

**TABLE 14: ASSET BETA FOR THE HEATING COMPANIES, BY YEAR**

| | | WACC Period | |
|---|---|---|---|
| | | 2023 | 2024-2025 |
| **Asset Beta** | | | |
| Power Generation | [1] | 0.68 | 0.61 |

| | | | | |
|---|---|---|---|---|
| Networks | [2] | | 0.35 | 0.28 |
| Utilities | [3] | | 0.53 | 0.48 |
| Telecom Operators | [4] | | 0.47 | 0.38 |
| **Beta for Heating Sector** | [5] | Average([1]-[4]) | 0.51 | 0.44 |

Notes: Weights for the heating sector are assumed to be equal to 25% across all groups.

# VII. Cost of Debt and Gearing for 2023-2025

## A. Cost of Debt

68. In 2019, the ACM determined the cost of debt of the heating companies as the sum of a credit spread plus the risk free rate, increased by 15 basis points to cover the costs of issuing debt. The methodology distinguished between existing and new debt and calculated the credit spread based on Bloomberg's BBB-rated 10-year utility index. However, a ruling by the CBb has determined that the cost of debt of the heating companies should be based on their actual debt costs.

69. In line with the CBb ruling, we use financial data on interest payments and interest bearing debt for a broad group of small and large heating companies to calculate the actual cost of debt of the heating companies as of 31 December of each year. For example, for the cost of debt for 2018 we use the actual cost of debt of the heating companies as of 31 December 2018. We then calculate the cost of debt for the heating sector for the period 2023-2025 based on the actual cost of debt of the heating companies as of 31 December 2022, being the latest available information at the time of writing this report.

70. In more detail, the ACM has provided us with information on interest charges and non-interest fees, outstanding interest-bearing debt (as of 31 December) and total assets for 19 small and large heating companies in the Netherlands between 2014 and 2022.[30]

[30] Note that in the 2022 Brattle Report, we used data for 24 companies. However, the ACM has asked us to exclude one company because the data they provided was not accurate. In the June 2023 update, two of these companies did not provide data anymore, while four new companies did; one of these four, however, had to be excluded because of inaccurate data, leading to a total of 24 companies. Furthermore, seven of the original 24 companies were effectively part of two separate groups, and have now reported their cost of debt data at the group level, effectively reducing the number of companies considered in the cost of debt calculation from 24 to 19. Finally, because some companies of this final set do not report interest-bearing debt and/or interest for 2022, this leads us to consider 15 and 13 companies for the calculation of the cost of debt and gearing, respectively.

71. For the 2023 WACC and the 2024-2025 WACC, we use the actual cost of debt of the heating companies taking the ratio between interest payments plus non-interest fees in 2022 and the average interest-bearing debt balance over 2021-2022.[31]

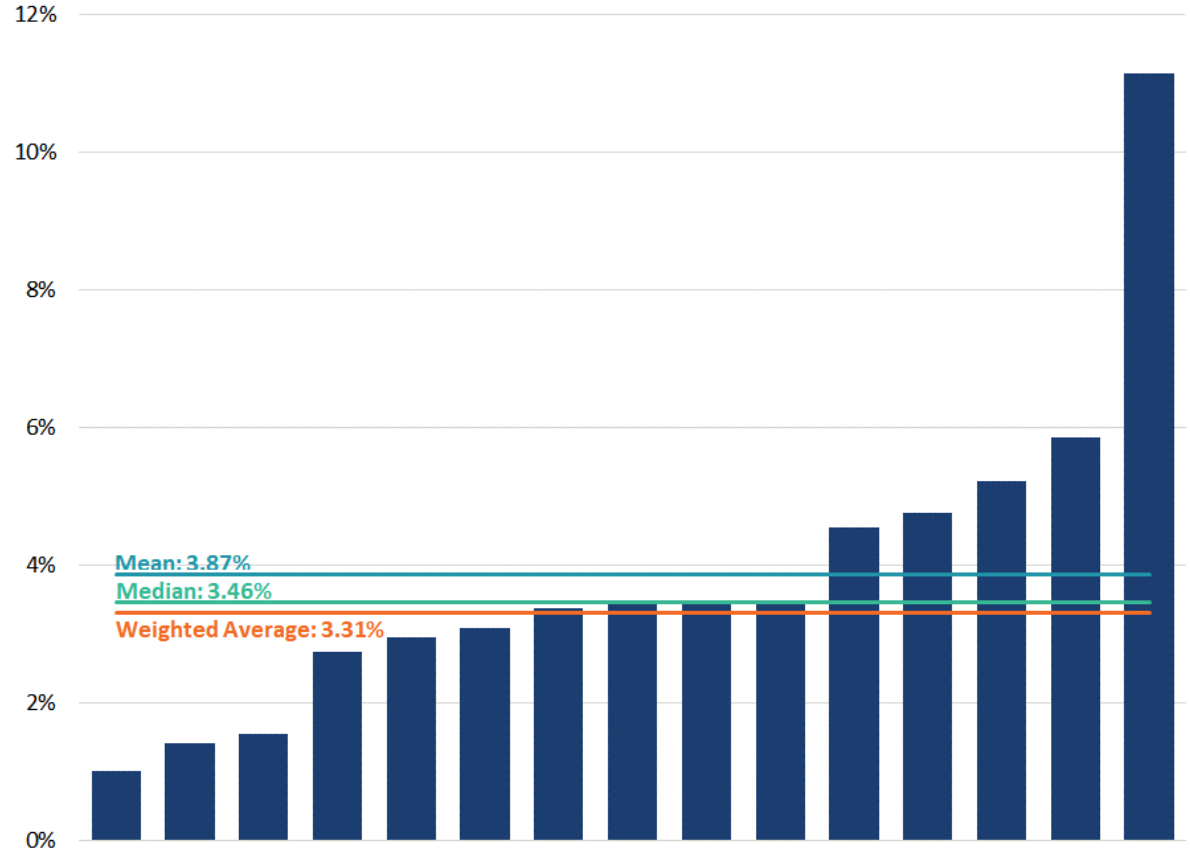
72. Figure 3, below, shows the results.[32] Overall, we observe high variability in the cost of debt values across companies, with the cost of debt, including non-interest fees, ranging between 1.0% and 11.1% in 2022. This high level variation largely reflects the effect of timing and amount of new bond issuances. Clearly, the time of the year in which new loans are issued and the amount of the new loan will dramatically affect the amount of interest the company will have to pay over the financial year.

73. Figure 3 also reports the mean, median and debt-weighted average cost of debt for each year. As we explained in the 2022 Brattle Report, we calculate the cost of debt for the heating companies based on the weighted average cost of debt of the individual companies. Using the weighted average is preferable, because it puts more weight on larger debt issuances that are more reliable, as the resulting interest rates are more stable and less vulnerable to the effects of changes from year to year, making the approach less sensitive to outliers. Accordingly, we select an interest cost of debt of 3.31%, equal to the weighted average cost of debt as of 31 December 2022 for the 2023 WACC and the 2024-2025 WACC.

[31] In line with the CBb ruling, the ACM has asked the heating companies' total cost of debt, including non-interest fees to account for the cost of issuing debt. Non-interest fees are typically lump sum fees that are paid when new debt is issued. Ideally, we should account for these fees by annualizing them, taking into account the amount and maturity of each new bond issuance. This approach is not feasible in practice, as it requires detailed information on individual issuances that is not available to us. In practice, however, averaging of non-interest fees (as a percentage of interest bearing debt) across many companies should lead to reliable results, because the lump sum fees on new bonds paid by some firms are averaged across firms.

[32] Note that four out of the 19 companies are fully financed with equity, hence only 15 companies are left for the cost of debt calculation as of December 2022. Accordingly, the figure only reports the cost of debt for these 15 companies.

FIGURE 3: COST OF DEBT OF THE HEATING COMPANIES IN THE NETHERLANDS IN 2022




Source: Brattle analysis of data provided by ACM on cost of debt for the heating companies.

# B. Gearing

74. The gearing used to re-lever the asset beta and to weight the cost of equity and the cost of debt should be consistent with the actual cost of debt of the heating companies. Accordingly, similar to the cost of debt, we calculate the gearing of the heating companies as of 31 December of 2022 as the ratio of interest bearing debt over total assets.[33]

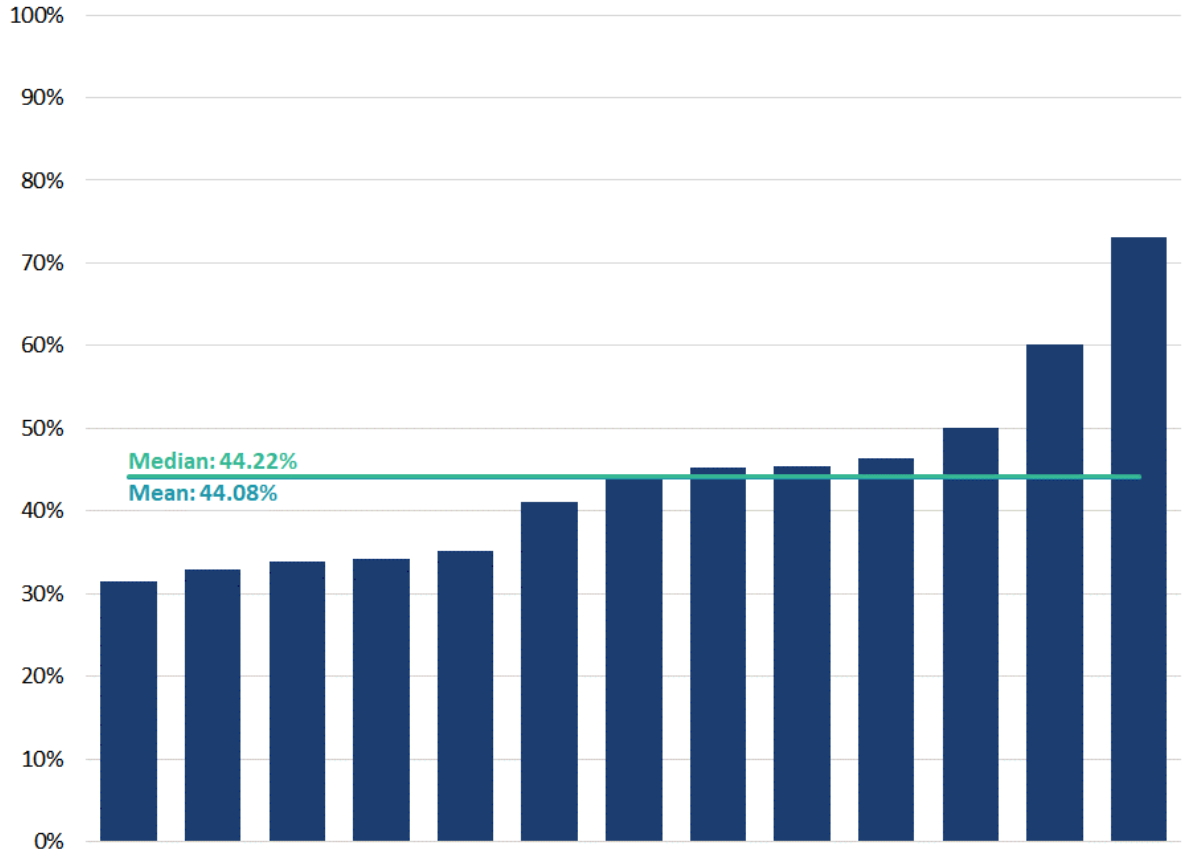
75. Figure 4 reports the results of our calculation of gearing for the individual companies.[34] Overall, the individual companies gearing in 2022 ranged between 31.5% and 73.1%. The

[33] We note that 'interest bearing debt' reported by the heating companies is quite different from 'balance sheet debt' reported by the same companies for the calculation of gearing. Accordingly, to make the calculation of gearing consistent with the calculation of the cost of debt, we calculate gearing as the ratio of 'interest bearing debt' and total balance sheet assets.

[34] Note that four of the 19 companies are fully financed with equity, whereas two other companies reported no debt as of December 2022. Hence, only 13 out of 19 companies are left for the gearing calculation. Accordingly, the figure only reports the gearing for these 13 companies.

mean and median gearing are equal to 44.1% And 44.2%, respectively. Based on the above, we select a gearing of 44%, which we apply to the 2023 and 2024-2025 WACC.

**FIGURE 4: GEARING FOR THE HEATING COMPANIES IN THE NETHERLANDS IN 2022**




Source: Brattle analysis of data provided by ACM on gearing for the heating companies.

# VIII. The WACC for the Heating Sector

76. Table 15 details our calculation of the WACC for the heating sector for 2023 and 2024-2025.[35]

**TABLE 15: WACC FOR THE HEATING SECTOR FOR 2023 AND THE 2024-2025 PERIOD**

| | | | WACC Period | |
|---|---|---|---|---|
| | | | 2023 | 2024-2025 |
| Gearing (D/A) | [1] | See note | 44.00% | 44.00% |
| Gearing (D/E) | [2] | [1]/(1-[1]) | 78.57% | 78.57% |
| Tax rate | [3] | ACM | 25.80% | 25.80% |
| Risk-free rate | [4] | See note | 0.43% | 0.83% |
| Asset beta | [5] | See note | 0.51 | 0.44 |
| Equity beta | [6] | [5]x(1+(1-[3])x[2]) | 0.81 | 0.69 |
| Equity Risk Premium | [7] | See note | 5.00% | 5.00% |
| After-tax cost of equity | [8] | [4]+[6]x[7] | 4.46% | 4.29% |
| Pre-tax cost of debt | [9] | See note | 3.31% | 3.31% |
| Nominal after-tax WACC | [10] | ((1-[1])x[8])+([1]x(1-[3])x[9]) | 3.58% | 3.48% |
| Nominal pre-tax WACC | [11] | [10]/(1-[3]) | 4.82% | 4.69% |

Sources and notes:

[1]: Brattle analysis of data provided by ACM on cost of debt for the heating companies. Gearing is assumed to be 44% for periods 2023 and 2024-2025.

[4]: Average risk-free rate in each WACC period.

[5]: Asset beta estimated in each WACC period.

[7]: Brattle elaboration based on DMS data.

[9]: Brattle analysis of data provided by ACM on cost of debt for the heating companies.

[35] The ACM has informed us that in July 2023 the Trade and Industry Appeals Tribunal (CBb) has issued a ruling in the appeals to the ACM method decisions for the energy network operators for 2022-2026, ordering the ACM to apply a lower bound of 0.5% to the nominal risk-free rate estimated using government bond yields affected by QE. The ACM may ultimately decide to apply this lower bound to the risk-free rate of the heating companies as well. Applying such a lower bound to the 2023 WACC would result in a nominal after-tax WACC of 3.62% and a nominal pre-tax WACC of 4.88%.

# IX. Cost of Debt, Gearing and the Resulting WACC for the Heating Companies for 2018-2022

77. The ACM has also asked us to update the calculation of the cost of debt, gearing and the resulting WACC – for the historical period 2018-2022.

78. We update the cost of debt calculation for years 2018-2022 in four ways:

    a. First, we account for the cost of non-interest fees which were not included in our July 2022 calculations.

    b. Second, in line with the July 2022 ruling by the CBb, we calculate the cost of debt for the heating sector for each year over the period 2018-2022 based on the actual cost of debt of the heating companies in the same year.

    c. Third, the ACM has asked us to exclude one company, which was initially included in our July 2022 calculation but which had reported debt and interest expenses at the consolidated group level and to include data from four additional companies.[36]

    d. Fourth, we aggregate the cost of debt and interest expenses of seven of the companies included in our July 2022 calculation in two groups, consistently with the way these companies reported debt and interest expenses for 2022.[37]

79. Table 16 below shows our updated cost of debt calculations for the heating companies for the years 2018-2022.[38]

[36] As we explain above in footnote 7, however, we exclude one of these four additional companies because of inaccurate data.

[37] Note that this aggregation does not affect the weighted average cost of debt, but only the average and the median.

[38] As we explained above, no update to the calculation of the cost of equity is necessary. Accordingly, for beta, the ERP and the risk-free rate we have applied the values calculated in the 2022 Brattle Report. The calculation of these parameters is nevertheless detailed in Appendix A.III.

**TABLE 16: COST OF DEBT OF THE HEATING COMPANIES IN THE NETHERLANDS FOR 2018-2021**

| | | 2018 | 2019 | 2020 | 2021 | |
|---|---|---|---|---|---|---|
| Company A | [1] | - | 1.80% | 3.71% | 5.58% | - |
| Company B | [2] | 1.38% | 1.28% | 1.25% | 1.88% | 1.41% |
| Company C | [3] | - | - | 3.78% | 2.70% | 2.94% |
| Company D | [4] | 2.70% | 1.98% | 2.09% | 2.35% | 3.47% |
| Company E | [5] | 1.30% | 2.32% | 1.20% | 1.63% | 1.54% |
| Company F | [6] | 2.69% | 2.99% | 3.48% | 2.79% | 3.48% |
| Company G | [7] | 5.20% | 4.88% | 4.78% | 7.75% | 5.86% |
| Company H | [8] | 4.90% | 3.88% | 4.18% | 4.65% | 4.75% |
| Company I | [9] | 5.54% | 5.48% | 5.36% | 8.40% | 4.54% |
| Company J | [10] | 2.26% | 1.43% | 1.12% | 1.49% | 1.02% |
| Company K | [11] | 3.79% | 5.83% | 4.83% | 6.05% | 11.14% |
| Company L | [12] | 4.40% | 3.69% | 3.59% | 3.04% | 3.08% |
| Company M | [13] | - | - | 11.30% | 0.50% | - |
| Company N | [14] | 1.71% | 3.61% | 2.78% | 2.00% | 3.38% |
| Company O | [15] | 1.15% | 2.50% | 2.57% | 2.60% | 2.73% |
| Company P | [16] | 1.41% | 1.70% | 1.71% | 1.91% | - |
| Company Q | [17] | 5.92% | 5.93% | 6.14% | 6.20% | 5.22% |
| Company R | [18] | - | - | - | - | - |
| Company S | [19] | 3.70% | 3.53% | 3.42% | 3.40% | 3.46% |
| **Mean** | **[20]** | **3.20%** | **3.30%** | **3.74%** | **3.61%** | **3.87%** |
| **Median** | **[21]** | **2.70%** | **3.26%** | **3.54%** | **2.74%** | **3.46%** |
| **Weighted-Average** | **[22]** | **2.47%** | **3.04%** | **3.00%** | **3.41%** | **3.31%** |

Source: Brattle analysis of data provided by ACM on gearing for the heating companies.

80. Consistently with our calculation of the cost of debt, which considers the actual cost in the same year for which we are calculating the WACC, we calculate the gearing based on the actual gearing of the heating companies in each year. Table 17 shows our results. For each year, we take the median gearing of heating companies considered, which we round to the closest integer. This results in a value of the gearing equal 43% in 2018 and 2019, 41% in 2020 and 2021, and 44% in 2022. [39]

[39] Unlike the cost of debt, the calculation of gearing is not affected by the timing of bond issuances because it considers the ratio of the stock of interest bearing debt and the stock of total assets both at the end of each year. Therefore, gearing is less sensitive to outliers and taking a weighted average of the gearing as we have done for the cost of debt is not necessary. Accordingly, consistently with our selection of beta, we select the gearing based on the median value of the gearing for the Dutch heating companies considered.

**TABLE 17: GEARING OF THE HEATING COMPANIES IN THE NETHERLANDS FOR 2018-2022**

| | | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| Company A | [1] | - | 43.42% | 35.84% | - | - |
| Company B | [2] | 61.23% | 60.74% | 61.73% | 58.81% | 60.12% |
| Company C | [3] | - | - | 48.58% | 47.19% | 44.22% |
| Company D | [4] | 47.07% | 44.58% | 43.74% | 41.77% | 41.08% |
| Company E | [5] | 29.18% | 27.53% | 40.58% | 39.93% | 31.51% |
| Company F | [6] | 32.70% | 31.14% | 28.08% | 28.90% | 35.07% |
| Company G | [7] | 35.49% | 34.31% | 33.41% | 0.00% | 34.17% |
| Company H | [8] | 45.79% | 45.19% | 43.38% | 38.72% | 45.38% |
| Company I | [9] | 42.78% | 41.85% | 40.30% | 41.02% | 45.19% |
| Company J | [10] | 16.05% | 16.39% | 35.92% | 34.42% | 32.96% |
| Company K | [11] | 47.93% | 48.12% | 44.80% | 43.88% | - |
| Company L | [12] | 50.00% | 50.00% | 50.00% | 50.00% | 50.00% |
| Company M | [13] | - | - | 29.68% | 54.46% | - |
| Company N | [14] | 27.35% | 4.00% | 10.84% | 12.34% | - |
| Company O | [15] | 37.19% | 39.83% | 38.55% | 36.56% | 33.93% |
| Company P | [16] | 42.76% | 41.43% | 40.64% | 39.99% | - |
| Company Q | [17] | 48.56% | 48.24% | 47.75% | 47.09% | 46.30% |
| Company R | [18] | - | - | - | - | - |
| Company S | [19] | 59.92% | 63.16% | 69.47% | 75.98% | 73.10% |
| **Mean** | **[20]** | **41.60%** | **40.00%** | **41.29%** | **40.65%** | **44.08%** |
| **Median** | **[21]** | **42.78%** | **42.64%** | **40.61%** | **41.02%** | **44.22%** |

Source: Brattle analysis of data provided by ACM on gearing for the heating companies.

81. Using the updated cost of debt and gearing rand the other parameters values estimated in our 2022 Brattle report, we update the WACC for the heating companies for the years 2018-2022. Table 18 below shows our results.[40]

**TABLE 18: WACC FOR THE HEATING COMPANIES FOR YEARS 2018-2022 PERIOD**

| | | WACC Period | | | | |
|---|---|---|---|---|---|---|
| | | 2018 | 2019 | 2020 | 2021 | 2022 |
| Gearing (D/A) | [1] | 43.00% | 43.00% | 41.00% | 41.00% | 44.00% |
| Gearing (D/E) | [2] | 75.44% | 75.44% | 69.49% | 69.49% | 78.57% |
| Tax rate | [3] | 25.00% | 25.00% | 25.00% | 25.00% | 25.80% |

[40] As explained above, in a July 2022 ruling the CBb has determined that a lower bound of 0.5% should be applied to the nominal risk-free rate. The ACM may decide to apply this lower bound to the heating companies as well. Applying such a lower bound to the 2021 and 2022 WACC would result for 2021 in a nominal after-tax WACC of 3.74% and a nominal pre-tax WACC of 4.98%, and for 2022 in a nominal after-tax WACC of 3.74% and a nominal pre-tax WACC of 5.04%.

| | | | | | | |
|---|---|---|---|---|---|---|
| Risk-free rate | [4] | 0.86% | 0.81% | 0.67% | 0.32% | 0.02% |
| Asset beta | [5] | 0.47 | 0.47 | 0.54 | 0.53 | 0.54 |
| Equity beta | [6] | 0.74 | 0.74 | 0.81 | 0.81 | 0.85 |
| Equity Risk Premium | [7] | 5.00% | 5.00% | 5.00% | 5.00% | 5.00% |
| After-tax cost of equity | [8] | 4.55% | 4.49% | 4.75% | 4.37% | 4.27% |
| Pre-tax cost of debt | [9] | 2.47% | 3.04% | 3.00% | 3.41% | 3.31% |
| Nominal after-tax WACC | [10] | 3.39% | 3.54% | 3.72% | 3.63% | 3.47% |
| Nominal pre-tax WACC | [11] | 4.52% | 4.72% | 4.96% | 4.84% | 4.68% |

Sources and notes:
[1]: Table 17.
[2]: [1]/(1-[1]).
[3]: ACM.
[4]-[8]: 2022 Brattle Report, pag. 10, Table 3.
[9]: Table 16.
[10]: ((1-[1])x[8])+([1]x(1-[3])x[9]).
[11]: [10]/(1-[3]).

# Appendix A.

## A.I. Results of the Liquidity Tests

82. In this Section, we report the list of peers that pass the liquidity and M&A tests for each WACC period. Liquidity tests are first based on a bid-ask spread test that excludes companies with spreads greater than or equal 1%. We further implement additional tests to corroborate our sample. Specifically, we exclude companies for which (i) stock is exchanged on less than 90% of days available for trading, or (ii) average revenues in the prior three years are less than €100 million, or (iii) the rating is below investment grade. M&A tests are aimed at excluding companies involved in transactions that had involved a sufficiently amount relative to the market capitalization of the company and had a sizeable effect on its returns; a detailed description is provided in the next Section.

83. Table 19, Table 20, Table 21 and Table 22 report a summary of results of liquidity and M&A tests for the 2023 WACC and the 2024-2025 WACC for the power generation, networks, utilities and telecom operators groups respectively. Table 23 and Table 24 report the details of each test for each candidate peer in the four comparable groups for the 2023 WACC and the 2024-2025 WACC, respectively.

**TABLE 19: SUMMARY OF LIQUIDITY AND M&A TESTS FOR POWER GENERATION, BY WACC PERIOD**

| | | Passes Liquidity and M&A Test | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| 7C Solarparken AG | Germany | ✗ | ✗ |
| A2A SpA | Italy | ✓ | ✓ |
| ADEV Wasserkraftwerk AG | Switzerland | ✗ | ✗ |
| Alerion Cleanpower SpA | Italy | ✗ | ✗ |
| Arise AB | Sweden | ✗ | ✗ |
| Athena Investments A/S | Denmark | ✗ | ✗ |
| Aventron AG | Switzerland | ✗ | ✗ |
| Clearvise AG | Germany | ✗ | ✗ |
| ContourGlobal PLC | Britain | ✗ | ✗ |
| Drax Group PLC | Britain | ✓ | ✓ |
| EAM Solar ASA | Norway | ✗ | ✗ |
| Edison SpA | Italy | ✓ | ✓ |
| Edisun Power Europe AG | Switzerland | ✗ | ✗ |

| | | | |
|---|---|---|---|
| EDP Renovaveis SA | Spain | ✓ | ✓ |
| Electricite de France SA | France | ✓ | ✓ |
| Electricite de Strasbourg SA | France | × | × |
| EnBW Energie Baden-Wuerttember | Germany | × | × |
| Encavis AG | Germany | ✓ | ✓ |
| Endesa SA | Spain | ✓ | ✓ |
| Energiekontor AG | Germany | ✓ | ✓ |
| Engie SA | France | ✓ | ✓ |
| ERG SpA | Italy | ✓ | ✓ |
| Etrion Corp | Switzerland | × | × |
| Frendy Energy SpA | Italy | × | × |
| Futuren SA | France | × | × |
| Good Energy Group PLC | Britain | × | × |
| Iberdrola SA | Spain | ✓ | ✓ |
| MVV Energie AG | Germany | × | × |
| OMV AG | Austria | ✓ | ✓ |
| Orsted AS | Denmark | ✓ | ✓ |
| Romande Energie Holding SA | Switzerland | × | × |
| Rurelec PLC | Britain | × | × |
| RWE AG | Germany | ✓ | ✓ |
| Scatec ASA | Norway | ✓ | ✓ |
| Solaria Energia y Medio Ambien | Spain | × | × |
| SSE PLC | Britain | ✓ | ✓ |
| Uniper SE | Germany | × | × |
| Velcan Holdings SA | France | × | × |
| Verbund AG | Austria | ✓ | ✓ |
| Voltalia SA | France | ✓ | ✓ |

Source: Brattle analysis of Bloomberg data.

**TABLE 20: SUMMARY OF LIQUIDITY AND M&A TESTS FOR NETWORKS, BY WACC PERIOD**

| | | Passes Liquidity and M&A Test | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| Elia Group SA/NV | Belgium | ✓ | ✓ |
| Enagas SA | Spain | ✓ | ✓ |
| Red Electrica Corp SA | Spain | ✓ | ✓ |
| REN - Redes Energeticas Nacion | Portugal | ✓ | ✓ |
| Snam SpA | Italy | ✓ | ✓ |
| Terna - Rete Elettrica Naziona | Italy | ✓ | ✓ |

Source: Brattle analysis of Bloomberg data.

**TABLE 21: SUMMARY OF LIQUIDITY AND M&A TESTS FOR UTILITIES, BY WACC PERIOD**

| | Passes Liquidity and M&A Test |
|---|---|

| | Country | 2023 | 2024-2025 |
|---|---|---|---|
| ACEA SpA | Italy | ✓ | ✓ |
| Acsm - Agam SpA | Italy | × | × |
| Agatos SpA | Italy | × | × |
| Aggregated Micro Power Holding | Britain | × | × |
| Alpiq Holding AG | Switzerland | × | × |
| Ascopiave SpA | Italy | ✓ | ✓ |
| Athens Water Supply & Sewage C | Greece | ✓ | ✓ |
| Atlantica Sustainable Infrastr | Britain | × | × |
| Audax Renovables SA | Spain | ✓ | ✓ |
| Bettwork Industries Inc | Switzerland | × | × |
| BKW AG | Switzerland | ✓ | ✓ |
| Burgenland Holding AG | Austria | × | × |
| Carpevigo Holding AG | Germany | × | × |
| Centrica PLC | Britain | ✓ | ✓ |
| Clean Invest Africa PLC | Britain | × | × |
| DGB GROUP NV | Netherlands | × | × |
| Eaux de Royan SA | France | × | × |
| Elektrische Licht & Kraftanlag | Germany | × | × |
| Elmera Group ASA | Norway | ✓ | ✓ |
| Eltech Anemos SA | Greece | × | × |
| Enel SpA | Italy | ✓ | ✓ |
| Enercity AG | Germany | × | × |
| Energiedienst Holding AG | Switzerland | ✓ | ✓ |
| EnergyO Solutions Invest AB | Sweden | × | × |
| Envitec Biogas AG | Germany | × | × |
| EVN AG | Austria | ✓ | ✓ |
| Fandango Holdings PLC | Britain | × | × |
| Fernheizwerk Neukoelln AG | Germany | × | × |
| Finaxo Environnement | France | × | × |
| Fintel Energia Group SpA | Italy | × | × |
| Galatia Energie | France | × | × |
| Gelsenwasser AG | Germany | × | × |
| Greencoat Renewables PLC | Ireland | × | × |
| Hera SpA | Italy | ✓ | ✓ |
| Holding Co ADMIE IPTO SA | Greece | × | × |
| Hydro-Exploitations SA | France | × | × |
| Innogy SE/DE | Germany | × | × |
| Iren SpA | Italy | ✓ | ✓ |
| Italgas SpA | Italy | ✓ | ✓ |
| ItN Nanovation AG | Germany | × | × |
| Jersey Electricity PLC | Britain | × | × |
| Lechwerke AG | Germany | × | × |
| Mainova AG | Germany | × | × |
| Minesto AB | Sweden | × | × |

| | | | |
|---|---|---|---|
| New Sources Energy NV | Netherlands | ✗ | ✗ |
| Pennon Group PLC | Britain | ✓ | ✓ |
| Photon Energy NV | Netherlands | ✗ | ✗ |
| Public Power Corp SA | Greece | ✗ | ✗ |
| R Energy One | Cyprus | ✗ | ✗ |
| Selected Energy SA | Greece | ✗ | ✗ |
| Severn Trent PLC | Britain | ✓ | ✓ |
| Skanska Energi AB | Sweden | ✗ | ✗ |
| Societe Electrique de l'Our SA | Luxembourg | ✗ | ✗ |
| Solarpack Corp Tecnologica SA | Spain | ✗ | ✗ |
| Thessaloniki Water Supply & Se | Greece | ✗ | ✗ |
| Trention AB | Sweden | ✗ | ✗ |
| United Utilities Group PLC | Britain | ✓ | ✓ |

Source: Brattle analysis of Bloomberg data.

**TABLE 22: SUMMARY OF LIQUIDITY AND M&A TESTS FOR TELECOM OPERATORS, BY WACC PERIOD**

| | | Passes Liquidity and M&A Test | |
|---|---|---|---|
| | Country | 2023 | 2024-2025 |
| Bouygues SA | France | ✓ | ✓ |
| DNA Oyj | Finland | ✗ | ✗ |
| Gamma Communications PLC | Britain | ✓ | ✓ |
| GO PLC | Malta | ✗ | ✗ |
| iliad SA | France | ✗ | ✗ |
| Liberty Global PLC | Britain | ✗ | ✗ |
| Masmovil Ibercom SA | Spain | ✗ | ✗ |
| NOS SGPS SA | Portugal | ✓ | ✓ |
| Orange Belgium SA | Belgium | ✓ | ✓ |
| Sunrise Communications Group A | Switzerland | ✗ | ✗ |
| TalkTalk Telecom Group Ltd | Britain | ✗ | ✗ |
| Tele2 AB | Sweden | ✓ | ✓ |
| Telefonica Deutschland Holding | Germany | ✓ | ✓ |
| Telenet Group Holding NV | Belgium | ✗ | ✗ |
| United Internet AG | Germany | ✓ | ✓ |
| VEON Ltd | Netherlands | ✗ | ✗ |
| Vodafone Group PLC | Britain | ✓ | ✓ |

Source: Brattle analysis of Bloomberg data.

TABLE 23: RESULTS OF THE LIQUIDITY AND M&A TESTS FOR THE 2023 WACC

| | | Values | | | Outcome | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Country | Revenue (average 2020-2022) | % of days company traded | % b-a spread | Revenue (average 2020-2022) | Rating | % of days company traded | % b-a spread | M&A | Peer passes liquidity tests |
| **Power & Renewables** | | | | | | | | | | |
| 7C Solarparken AG | Germany | 64 | 99% | 0.8% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| A2A SpA | Italy | 13,651 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ADEV Wasserkraftwerk AG | Switzerland | 2 | 5% | 27.0% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Alerion Cleanpower SpA | Italy | 171 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✗ | ✓ |
| Arise AB | Sweden | 50 | 98% | 0.7% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Athena Investments A/S | Denmark | n.a. | 36% | 1.2% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Aventron AG | Switzerland | 122 | 23% | 8.1% | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Clearvise AG | Germany | 44 | 97% | 3.8% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| ContourGlobal PLC | Britain | 1,916 | 99% | 0.5% | ✓ | ✗ | ✓ | ✓ | ✓ | ✗ |
| Drax Group PLC | Britain | 6,606 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| EAM Solar ASA | Norway | 1 | 97% | 4.1% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| Edison SpA | Italy | 16,170 | 99% | 0.9% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edisun Power Europe AG | Switzerland | 15 | 90% | 1.6% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| EDP Renovaveis SA | Spain | 1,953 | 100% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Electricite de France SA | France | 98,989 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Electricite de Strasbourg SA | France | 968 | 99% | 1.2% | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ |
| EnBW Energie Baden-Wuerttember | Germany | 35,948 | 99% | 2.9% | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ |
| Encavis AG | Germany | 371 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Endesa SA | Spain | 23,615 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Energiekontor AG | Germany | 164 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Engie SA | France | 65,346 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ERG SpA | Italy | 881 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Etrion Corp | Switzerland | 0 | 39% | 41.3% | × | ✓ | × | × | ✓ | × |
| Frendy Energy SpA | Italy | 2 | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Futuren SA | France | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Good Energy Group PLC | Britain | 203 | 99% | 4.2% | ✓ | ✓ | ✓ | × | ✓ | × |
| Iberdrola SA | Spain | 42,069 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MVV Energie AG | Germany | 4,530 | 97% | 1.6% | ✓ | ✓ | ✓ | × | ✓ | × |
| OMV AG | Austria | 38,135 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Orsted AS | Denmark | 11,651 | 97% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Romande Energie Holding SA | Switzerland | 605 | 96% | 1.3% | ✓ | ✓ | ✓ | × | ✓ | × |
| Rurelec PLC | Britain | 0 | 73% | 15.9% | × | ✓ | × | × | ✓ | × |
| RWE AG | Germany | 25,527 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Scatec ASA | Norway | 334 | 98% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Solaria Energia y Medio Ambien | Spain | 96 | 100% | 0.1% | × | ✓ | ✓ | ✓ | × | × |
| SSE PLC | Britain | 8,518 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Uniper SE | Germany | 163,022 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | × | ✓ |
| Velcan Holdings SA | France | 3 | 78% | 4.1% | × | ✓ | × | × | ✓ | × |
| Verbund AG | Austria | 6,191 | 99% | 0.3% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Voltalia SA | France | 388 | 100% | 0.4% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Networks** | | | | | | | | | | |
| Elia Group SA/NV | Belgium | 2,963 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Enagas SA | Spain | 1,010 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Red Electrica Corp SA | Spain | 2,020 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| REN - Redes Energeticas Nacion | Portugal | 572 | 100% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Snam SpA | Italy | 3,172 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Terna - Rete Elettrica Naziona | Italy | 2,603 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Utilities** | | | | | | | | | | |
| ACEA SpA | Italy | 3,993 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acsm - Agam SpA | Italy | 493 | 0% | n.a. | ✓ | ✓ | × | × | ✓ | × |
| Agatos SpA | Italy | 12 | 99% | 1.6% | × | ✓ | ✓ | × | ✓ | × |
| Aggregated Micro Power Holding | Britain | n.a. | 1% | 7.2% | × | ✓ | × | × | ✓ | × |
| Alpiq Holding AG | Switzerland | 8,291 | 0% | n.a. | ✓ | ✓ | × | × | ✓ | × |
| Ascopiave SpA | Italy | 154 | 99% | 0.7% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Athens Water Supply & Sewage C | Greece | 345 | 97% | 0.5% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Atlantica Sustainable Infrastr | Britain | 988 | 100% | 0.1% | ✓ | × | ✓ | ✓ | ✓ | × |
| Audax Renovables SA | Spain | 1,759 | 100% | 0.5% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bettwork Industries Inc | Switzerland | n.a. | 36% | 104.0% | × | ✓ | × | × | ✓ | × |
| BKW AG | Switzerland | 3,638 | 98% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Burgenland Holding AG | Austria | 11 | 35% | 4.4% | × | ✓ | × | × | ✓ | × |
| Carpevigo Holding AG | Germany | n.a. | 4% | 13.6% | × | ✓ | × | × | ✓ | × |
| Centrica PLC | Britain | 19,596 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Clean Invest Africa PLC | Britain | n.a. | 12% | 71.6% | × | ✓ | × | × | ✓ | × |
| DGB GROUP NV | Netherlands | 1 | 95% | 3.0% | × | ✓ | ✓ | × | ✓ | × |
| Eaux de Royan SA | France | n.a. | 53% | 5.3% | × | ✓ | × | × | ✓ | × |
| Elektrische Licht & Kraftanlag | Germany | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Elmera Group ASA | Norway | 1,469 | 98% | 0.4% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Eltech Anemos SA | Greece | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Enel SpA | Italy | 94,466 | 99% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Enercity AG | Germany | 3,702 | 0% | n.a. | ✓ | ✓ | × | × | ✓ | × |
| Energiedienst Holding AG | Switzerland | 1,222 | 95% | 0.7% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| EnergyO Solutions Invest AB | Sweden | -22 | 70% | 2.9% | × | ✓ | × | × | ✓ | × |
| Envitec Biogas AG | Germany | 279 | 99% | 1.9% | ✓ | ✓ | ✓ | × | ✓ | × |
| EVN AG | Austria | 2,855 | 99% | 0.4% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Fandango Holdings PLC | Britain | 0 | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Fernheizwerk Neukoelln AG | Germany | 46 | 73% | 3.3% | × | ✓ | × | × | ✓ | × |
| Finaxo Environnement | France | n.a. | 0% | 188.8% | × | ✓ | × | × | ✓ | × |
| Fintel Energia Group SpA | Italy | 41 | 1% | 6.1% | × | ✓ | × | × | ✓ | × |
| Galatia Energie | France | n.a. | 5% | 58.9% | × | ✓ | × | × | ✓ | × |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gelsenwasser AG | Germany | 7,153 | 84% | 6.0% | ✓ | ✓ | × | × | ✓ | × |
| Greencoat Renewables PLC | Ireland | 99 | 99% | 1.0% | × | ✓ | ✓ | × | ✓ | × |
| Hera SpA | Italy | 12,572 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Holding Co ADMIE IPTO SA | Greece | 0 | 97% | 0.5% | × | ✓ | ✓ | ✓ | ✓ | × |
| Hydro-Exploitations SA | France | 81 | 15% | 45.0% | × | ✓ | × | × | × | × |
| Innogy SE/DE | Germany | n.a. | 14% | 0.3% | × | ✓ | × | ✓ | ✓ | × |
| Iren SpA | Italy | 5,331 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Italgas SpA | Italy | 2,077 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ItN Nanovation AG | Germany | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Jersey Electricity PLC | Britain | 134 | 89% | 2.9% | ✓ | ✓ | × | × | ✓ | × |
| Lechwerke AG | Germany | 1,709 | 74% | 3.2% | ✓ | ✓ | × | × | ✓ | × |
| Mainova AG | Germany | 4,386 | 44% | 5.2% | ✓ | ✓ | × | × | ✓ | × |
| Minesto AB | Sweden | 0 | 98% | 0.6% | × | ✓ | ✓ | ✓ | ✓ | × |
| New Sources Energy NV | Netherlands | 0 | 93% | 4.4% | × | ✓ | ✓ | × | ✓ | × |
| Pennon Group PLC | Britain | 787 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photon Energy NV | Netherlands | 53 | 98% | 1.6% | × | ✓ | ✓ | × | ✓ | × |
| Public Power Corp SA | Greece | 7,203 | 97% | 0.3% | ✓ | × | ✓ | ✓ | × | × |
| R Energy One | Cyprus | 3 | 0% | 7.7% | × | ✓ | × | × | ✓ | × |
| Selected Energy SA | Greece | n.a. | 0% | n.a. | × | ✓ | × | × | × | × |
| Severn Trent PLC | Britain | 2,147 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Skanska Energi AB | Sweden | 38 | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Societe Electrique de l'Our SA | Luxembourg | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Solarpack Corp Tecnologica SA | Spain | 149 | 65% | 0.7% | ✓ | ✓ | × | ✓ | ✓ | × |
| Thessaloniki Water Supply & Se | Greece | 72 | 96% | 1.0% | × | ✓ | ✓ | ✓ | ✓ | × |
| Trention AB | Sweden | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| United Utilities Group PLC | Britain | 2,115 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Telecom Operators** | | | | | | | | | | |
| Bouygues SA | France | 38,868 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Gamma Communications PLC | Britain | 511 | 100% | 0.4% | ✓ | ✓ | ✓ | ✓ | | ✓ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| GO PLC | Malta | 198 | 56% | 3.3% | ✓ | ✓ | × | × | × |
| iliad SA | France | 7,276 | 58% | 0.1% | ✓ | × | × | ✓ | × |
| Liberty Global PLC | Britain | 8,566 | 100% | 0.1% | ✓ | × | ✓ | ✓ | × |
| Masmovil Ibercom SA | Spain | 1,707 | 28% | 0.1% | ✓ | ✓ | × | ✓ | × |
| NOS SGPS SA | Portugal | 1,440 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Orange Belgium SA | Belgium | 1,357 | 100% | 0.6% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sunrise Communications Group A | Switzerland | n.a. | 41% | 0.1% | × | ✓ | × | ✓ | × |
| TalkTalk Telecom Group Ltd | Britain | 1,795 | 40% | 0.2% | ✓ | × | × | ✓ | × |
| Tele2 AB | Sweden | 2,606 | 98% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Telefonica Deutschland Holding | Germany | 7,840 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Telenet Group Holding NV | Belgium | 2,612 | 100% | 0.1% | ✓ | × | ✓ | ✓ | × |
| United Internet AG | Germany | 5,643 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ |
| VEON Ltd | Netherlands | 5,519 | 98% | 1.5% | ✓ | ✓ | ✓ | × | × |
| Vodafone Group PLC | Britain | 44,788 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ |

Source: Brattle analysis of Bloomberg data.

TABLE 24: RESULTS OF THE LIQUIDITY AND M&A TESTS FOR THE 2024-2025 WACC

| | | Values | | | Outcome | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Country | Revenue (average 2020-2022) | % of days company traded | % b-a spread | Revenue (average 2020-2022) | Rating | % of days company traded | % b-a spread | M&A | Peer passes liquidity tests |
| **Power & Renewables** | | | | | | | | | | |
| 7C Solarparken AG | Germany | 64 | 99% | 0.8% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| A2A SpA | Italy | 13,651 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ADEV Wasserkraftwerk AG | Switzerland | 2 | 4% | 22.5% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Alerion Cleanpower SpA | Italy | 171 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✗ | ✓ |
| Arise AB | Sweden | 50 | 98% | 0.6% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Athena Investments A/S | Denmark | n.a. | 22% | 0.9% | ✗ | ✓ | ✗ | ✓ | ✓ | ✗ |
| Aventron AG | Switzerland | 122 | 20% | 8.6% | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Clearvise AG | Germany | 44 | 97% | 3.7% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| ContourGlobal PLC | Britain | 1,916 | 84% | 0.4% | ✓ | ✗ | ✗ | ✓ | ✓ | ✗ |
| Drax Group PLC | Britain | 6,606 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| EAM Solar ASA | Norway | 1 | 96% | 4.6% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| Edison SpA | Italy | 16,170 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edisun Power Europe AG | Switzerland | 15 | 89% | 1.4% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| EDP Renovaveis SA | Spain | 1,953 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Electricite de France SA | France | 98,989 | 97% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Electricite de Strasbourg SA | France | 968 | 99% | 1.1% | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ |
| EnBW Energie Baden-Wuerttember | Germany | 35,948 | 99% | 3.1% | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ |
| Encavis AG | Germany | 371 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Endesa SA | Spain | 23,615 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Energiekontor AG | Germany | 164 | 99% | 0.6% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Engie SA | France | 65,346 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ERG SpA | Italy | 881 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Etrion Corp | Switzerland | 0 | 47% | 54.4% | × | ✓ | × | × | ✓ | × |
| Frendy Energy SpA | Italy | 2 | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Futuren SA | France | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Good Energy Group PLC | Britain | 203 | 99% | 4.4% | ✓ | ✓ | ✓ | × | ✓ | × |
| Iberdrola SA | Spain | 42,069 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MVV Energie AG | Germany | 4,530 | 97% | 2.0% | ✓ | ✓ | ✓ | × | ✓ | × |
| OMV AG | Austria | 38,135 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Orsted AS | Denmark | 11,651 | 97% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Romande Energie Holding SA | Switzerland | 605 | 96% | 1.3% | ✓ | ✓ | ✓ | × | ✓ | × |
| Rurelec PLC | Britain | 0 | 74% | 14.9% | × | ✓ | × | × | ✓ | × |
| RWE AG | Germany | 25,527 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Scatec ASA | Norway | 334 | 98% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Solaria Energia y Medio Ambien | Spain | 96 | 100% | 0.1% | × | ✓ | ✓ | ✓ | × | × |
| SSE PLC | Britain | 8,518 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Uniper SE | Germany | 163,022 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | × | ✓ |
| Velcan Holdings SA | France | 3 | 79% | 3.9% | × | ✓ | × | × | ✓ | × |
| Verbund AG | Austria | 6,191 | 99% | 0.3% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Voltalia SA | France | 388 | 100% | 0.3% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Networks** | | | | | | | | | | |
| Elia Group SA/NV | Belgium | 2,963 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Enagas SA | Spain | 1,010 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Red Electrica Corp SA | Spain | 2,020 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| REN - Redes Energeticas Nacion | Portugal | 572 | 100% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Snam SpA | Italy | 3,172 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Terna - Rete Elettrica Naziona | Italy | 2,603 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Utilities** | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ACEA SpA | Italy | 3,993 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Acsm - Agam SpA | Italy | 493 | 0% | n.a. | ✓ | ✓ | × | × | ✓ | × |
| Agatos SpA | Italy | 12 | 99% | 1.5% | × | ✓ | ✓ | × | ✓ | × |
| Aggregated Micro Power Holding | Britain | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Alpiq Holding AG | Switzerland | 8,291 | 0% | n.a. | ✓ | ✓ | × | × | ✓ | × |
| Ascopiave SpA | Italy | 154 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Athens Water Supply & Sewage C | Greece | 345 | 97% | 0.5% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Atlantica Sustainable Infrastr | Britain | 988 | 100% | 0.1% | ✓ | × | ✓ | ✓ | ✓ | × |
| Audax Renovables SA | Spain | 1,759 | 100% | 0.5% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bettwork Industries Inc | Switzerland | n.a. | 25% | 128.3% | × | ✓ | × | × | ✓ | × |
| BKW AG | Switzerland | 3,638 | 98% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Burgenland Holding AG | Austria | 11 | 34% | 5.4% | × | ✓ | × | × | ✓ | × |
| Carpevigo Holding AG | Germany | n.a. | 4% | 15.0% | × | ✓ | × | × | ✓ | × |
| Centrica PLC | Britain | 19,596 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Clean Invest Africa PLC | Britain | n.a. | 11% | 69.0% | × | ✓ | × | × | ✓ | × |
| DGB GROUP NV | Netherlands | 1 | 96% | 2.9% | × | ✓ | ✓ | × | ✓ | × |
| Eaux de Royan SA | France | n.a. | 54% | 5.2% | × | ✓ | × | × | ✓ | × |
| Elektrische Licht & Kraftanlag | Germany | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Elmera Group ASA | Norway | 1,469 | 98% | 0.3% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Eltech Anemos SA | Greece | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Enel SpA | Italy | 94,466 | 99% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Enercity AG | Germany | 3,702 | 0% | n.a. | ✓ | ✓ | × | × | ✓ | × |
| Energiedienst Holding AG | Switzerland | 1,222 | 94% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| EnergyO Solutions Invest AB | Sweden | -22 | 55% | 2.8% | × | ✓ | × | × | ✓ | × |
| Envitec Biogas AG | Germany | 279 | 99% | 1.7% | ✓ | ✓ | ✓ | × | ✓ | × |
| EVN AG | Austria | 2,855 | 99% | 0.4% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Fandango Holdings PLC | Britain | 0 | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Fernheizwerk Neukoelln AG | Germany | 46 | 70% | 3.5% | × | ✓ | × | × | ✓ | × |
| Finaxo Environnement | France | n.a. | 0% | n.a. | × | ✓ | × | × | ✓ | × |
| Fintel Energia Group SpA | Italy | 41 | 0% | n.a. | × | ✓ | × | × | ✓ | × |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Galatia Energie | France | n.a. | 1% | 39.9% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Gelsenwasser AG | Germany | 7,153 | 80% | 6.8% | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Greencoat Renewables PLC | Ireland | 99 | 99% | 0.9% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Hera SpA | Italy | 12,572 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Holding Co ADMIE IPTO SA | Greece | 0 | 97% | 0.4% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Hydro-Exploitations SA | France | 81 | 14% | 46.0% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Innogy SE/DE | Germany | n.a. | 0% | n.a. | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Iren SpA | Italy | 5,331 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Italgas SpA | Italy | 2,077 | 99% | 0.2% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ItN Nanovation AG | Germany | n.a. | 0% | n.a. | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Jersey Electricity PLC | Britain | 134 | 88% | 3.2% | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Lechwerke AG | Germany | 1,709 | 72% | 3.5% | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Mainova AG | Germany | 4,386 | 43% | 5.3% | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Minesto AB | Sweden | 0 | 98% | 0.6% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| New Sources Energy NV | Netherlands | 0 | 92% | 4.6% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| Pennon Group PLC | Britain | 787 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photon Energy NV | Netherlands | 53 | 97% | 1.5% | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ |
| Public Power Corp SA | Greece | 7,203 | 97% | 0.3% | ✓ | ✗ | ✓ | ✓ | ✓ | ✗ |
| R Energy One | Cyprus | 3 | 0% | 8.0% | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Selected Energy SA | Greece | n.a. | 0% | n.a. | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Severn Trent PLC | Britain | 2,147 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Skanska Energi AB | Sweden | 38 | 0% | n.a. | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Societe Electrique de l'Our SA | Luxembourg | n.a. | 0% | n.a. | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Solarpack Corp Tecnologica SA | Spain | 149 | 50% | 0.6% | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| Thessaloniki Water Supply & Se | Greece | 72 | 96% | 0.9% | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Trention AB | Sweden | n.a. | 0% | n.a. | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| United Utilities Group PLC | Britain | 2,115 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Telecom Operators** | | | | | | | | | | |
| Bouygues SA | France | 38,868 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | | ✓ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Gamma Communications PLC | Britain | 511 | 100% | 0.3% | ✓ | ✓ | ✓ | ✓ | ✓ |
| GO PLC | Malta | 198 | 55% | 3.3% | ✓ | ✓ | × | × | × |
| iliad SA | France | 7,276 | 43% | 0.1% | ✓ | × | × | ✓ | × |
| Liberty Global PLC | Britain | 8,566 | 100% | 0.1% | ✓ | × | ✓ | ✓ | × |
| Masmovil Ibercom SA | Spain | 1,707 | 13% | 0.1% | ✓ | ✓ | × | ✓ | × |
| NOS SGPS SA | Portugal | 1,440 | 100% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Orange Belgium SA | Belgium | 1,357 | 100% | 0.6% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sunrise Communications Group A | Switzerland | n.a. | 26% | 0.2% | × | ✓ | × | ✓ | × |
| TalkTalk Telecom Group Ltd | Britain | 1,795 | 25% | 0.2% | ✓ | × | × | ✓ | × |
| Tele2 AB | Sweden | 2,606 | 98% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Telefonica Deutschland Holding | Germany | 7,840 | 99% | 0.8% | ✓ | ✓ | ✓ | ✓ | ✓ |
| Telenet Group Holding NV | Belgium | 2,612 | 100% | 0.1% | ✓ | × | ✓ | ✓ | × |
| United Internet AG | Germany | 5,643 | 99% | 0.1% | ✓ | ✓ | ✓ | ✓ | ✓ |
| VEON Ltd | Netherlands | 5,519 | 98% | 1.9% | ✓ | ✓ | ✓ | × | × |
| Vodafone Group PLC | Britain | 44,788 | 100% | 0.0% | ✓ | ✓ | ✓ | ✓ | ✓ |

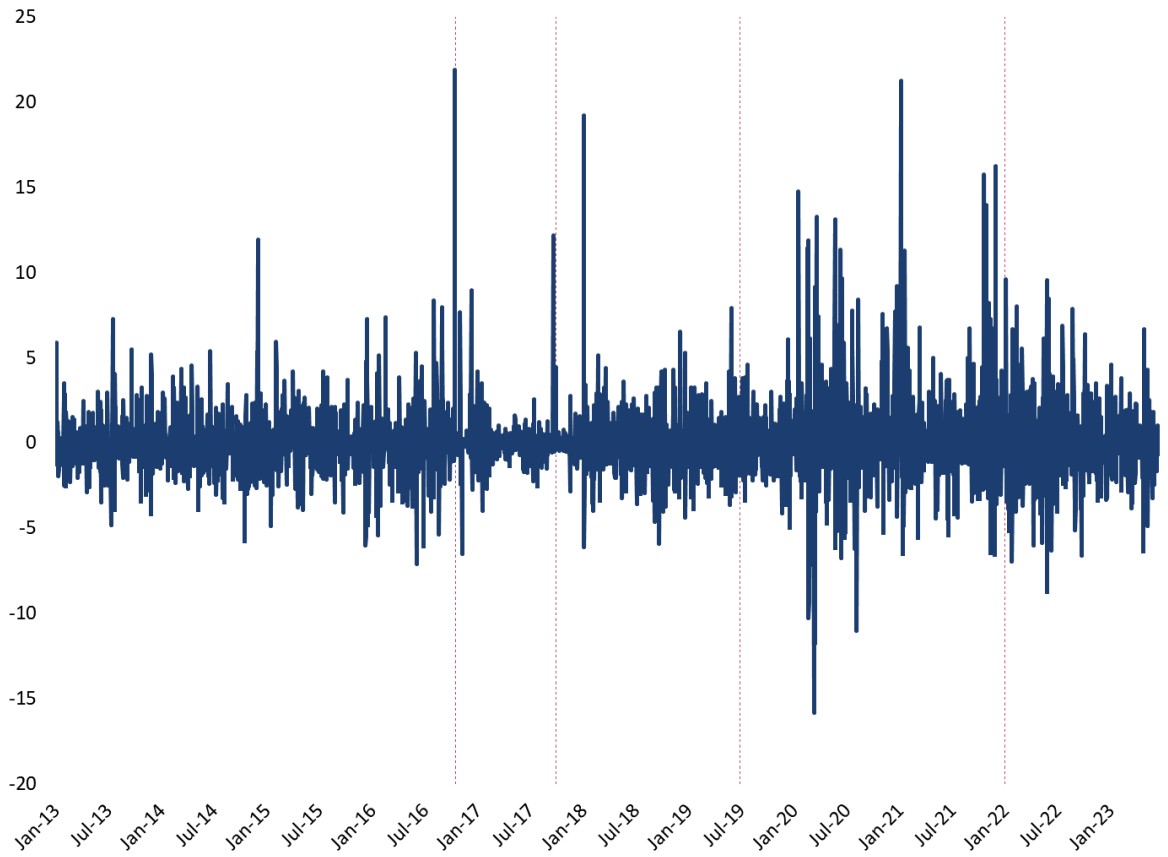
Source: Brattle analysis of Bloomberg data.

# A.II. Companies Excluded because of Sizeable M&A Transactions

84. We exclude Alerion Cleanpower SpA, Falck Renewables SpA and Uniper SE because of sizeable M&A transactions – that is, transactions 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.

85. In Figure 5 we report Alerion's day to day returns gross of dividends. On 28 December 2021, the press reported that the controlling shareholder was looking for an investor in the firm.[41] The result was an increase in volatility, as shown in the figure. We exclude the company for 2023 and 2024-2025.

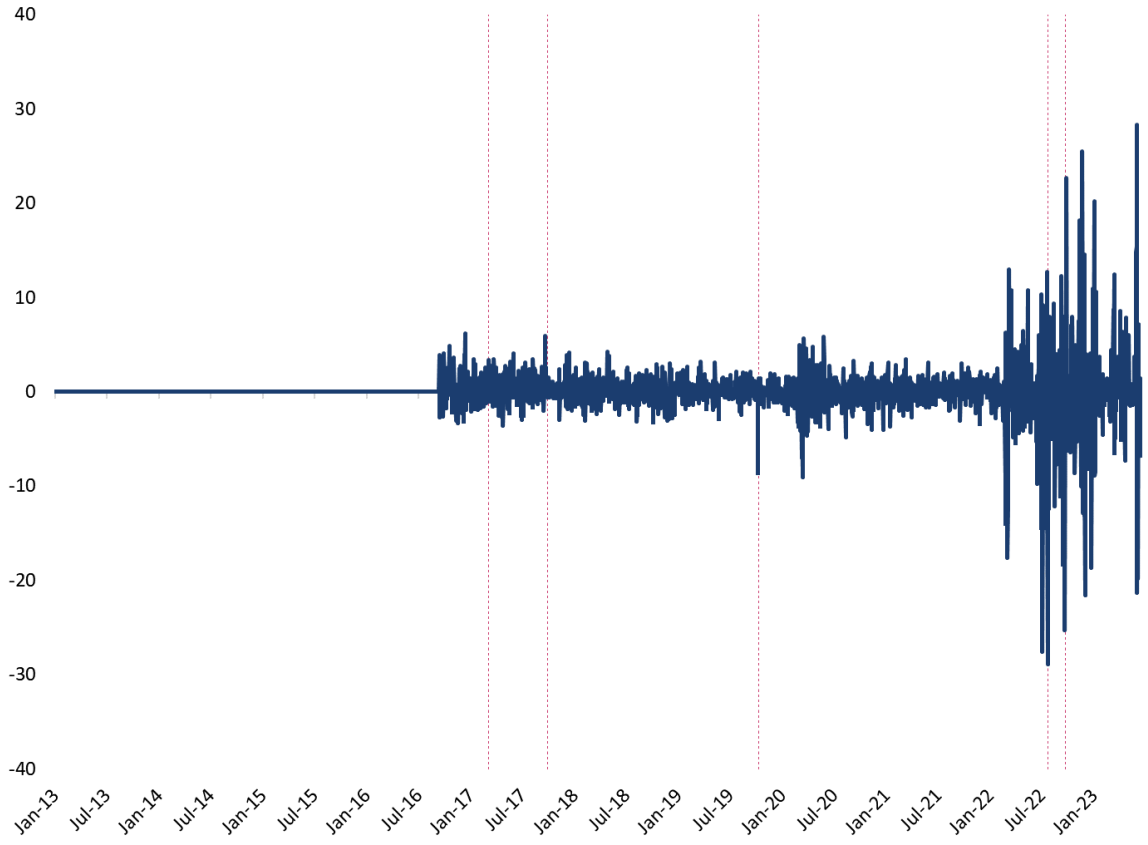
**FIGURE 5: EVOLUTION OF RETURNS, ALERION CLEANPOWER SPA**




[41] Reuters, "Alerion shares soar as Italian owner gears up to find new investor," December 28, 2021. Available at: https://www.reuters.com/markets/deals/alerion-shares-soar-italian-owner-gears-up-find-new-investor-2021-12-28/

86. In Figure 6 we report Uniper's day to day returns gross of dividends. On 21 September 2022 the German government announced it would acquire 99% shares of Uniper. The result was an increase in volatility, as it is shown in the figure.[42] We exclude the company for year 2023 and 2024-2025.

**FIGURE 6: EVOLUTION OF RETURNS, UNIPER SE**




[42] Uniper SE, "Press release", September 21,2021. Available at: https://www.uniper.energy/system/files/2022-10/20220921-uniper-pr-stabilization-en.pdf

# A.III. Cost of Equity: Risk-Free Rate and Beta for the Heating Companies for 2018-2022

87. In this appendix we detail the calculation of the risk-free rate and of the asset beta for the heating companies for the years 2018-2022, as reported in our July 2022 report. Specifically:

a. Table 25 shows the three-year average yields of German and Dutch government bonds used to calculate the risk-free rate for the years 2018 throughout 2022.

b. Table 26, Table 27, Table 28, Table 29 and Table 30 show the equity and asset betas for the years 2018-2022 for each of the four comparator groups – power generation, networks, utilities and telecom operators, respectively.

c. Table 31 calculates the asset beta for the heating sector in years 2018-2022 taking the average of the median asset betas of the four comparable groups in each year.

**TABLE 25: RISK-FREE RATE FOR THE HEATING COMPANIES, BY YEAR**

| | | Germany<br>[A]<br>See Note | Netherlands<br>[B]<br>See Note | Average<br>[C]<br>Average([A], [B]) |
|---|---|---|---|---|
| **Relevant WACC Period** | | | | |
| 2018 | [1] | 0.81 | 0.91 | 0.86 |
| 2019 | [2] | 0.77 | 0.85 | 0.81 |
| 2020 | [3] | 0.64 | 0.71 | 0.67 |
| 2021 | [4] | 0.27 | 0.37 | 0.32 |
| 2022 | [5] | -0.06 | 0.09 | 0.02 |

Source and notes: Bloomberg.
[1]: Average over the period 1 January 2015 – 31 December 2017.
[2]: Average over the period 1 January 2016 – 31 December 2018.
[3]: Average over the period 1 January 2017 – 31 December 2019.
[4]: Average over the period 1 January 2018 – 31 December 2020.
[5]: Average over the period 1 January 2019 – 31 December 2021.

**TABLE 26: EQUITY AND ASSET BETAS FOR THE 2018 WACC**

| | | | Equity Beta [A] | Beta chosen [B] | Gearing (D/E) [C] | Tax Rate [D] | Asset Beta [E] |
|---|---|---|---|---|---|---|---|
| **Power Generation** | | | | | | | |
| A2A SpA | Italy | | 0.85 | Daily | 85.6% | 24.0% | 0.51 |
| Albioma SA | France | | 0.56 | Daily | 97.6% | 27.9% | 0.33 |
| Drax Group PLC | Britain | | 1.49 | Weekly | 11.8% | 19.0% | 1.36 |
| EDP Renovaveis SA | Spain | | 0.75 | Daily | 59.3% | 25.0% | 0.52 |
| Electricite de France SA | France | | 1.07 | Daily | 126.2% | 27.9% | 0.56 |
| Electricite de Strasbourg SA | France | | 0.59 | Daily | 0.0% | 27.9% | 0.59 |
| Endesa SA | Spain | | 0.59 | Daily | 22.3% | 25.0% | 0.51 |
| Engie SA | France | | 1.00 | Daily | 69.5% | 27.9% | 0.67 |
| ERG SpA | Italy | | 0.67 | Daily | 68.3% | 24.0% | 0.44 |
| Falck Renewables SpA | Italy | | 0.87 | Weekly | 184.9% | 24.0% | 0.36 |
| Iberdrola SA | Spain | | 0.76 | Weekly | 70.4% | 25.0% | 0.50 |
| OMV AG | Austria | | 0.87 | Daily | 35.7% | 25.0% | 0.68 |
| RWE AG | Germany | | 1.25 | Daily | 87.5% | 30.0% | 0.77 |
| Scatec ASA | Norway | | 0.85 | Daily | 123.9% | 22.0% | 0.43 |
| SSE PLC | Britain | | 0.87 | Daily | 41.1% | 19.0% | 0.65 |
| Verbund AG | Austria | | 0.65 | Weekly | 59.2% | 25.0% | 0.45 |
| Voltalia SA | France | | 0.12 | Daily | 91.7% | 27.9% | 0.07 |
| Median | | [1] | 0.85 | | 69.5% | | 0.51 |
| **Networks** | | | | | | | |
| Elia Group SA/NV | Belgium | | 0.35 | Daily | 95.4% | 27.1% | 0.21 |
| Enagas SA | Spain | | 0.62 | Daily | 75.9% | 25.0% | 0.40 |
| Red Electrica Corp SA | Spain | | 0.34 | Daily | 58.4% | 25.0% | 0.24 |
| REN - Redes Energeticas Nacion | Portugal | | 0.54 | Daily | 175.4% | 21.0% | 0.23 |
| Snam SpA | Italy | | 0.57 | Weekly | 82.9% | 24.0% | 0.35 |
| Terna - Rete Elettrica Naziona | Italy | | 0.55 | Weekly | 88.9% | 24.0% | 0.33 |
| Median | | [2] | 0.55 | | 85.9% | | 0.28 |
| **Utilities** | | | | | | | |
| ACEA SpA | Italy | | 0.65 | Daily | 83.8% | 24.0% | 0.40 |
| Acsm - Agam SpA | Italy | | 0.38 | Weekly | 89.3% | 24.0% | 0.23 |
| Ascopiave SpA | Italy | | 0.48 | Weekly | 15.4% | 24.0% | 0.43 |
| BKW AG | Switzerland | | 0.28 | Daily | 19.8% | 15.5% | 0.24 |
| Centrica PLC | Britain | | 0.87 | Weekly | 42.4% | 19.0% | 0.65 |
| Enel SpA | Italy | | 0.90 | Weekly | 103.1% | 24.0% | 0.51 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Energiedienst Holding AG | Switzerland | | 0.03 | Daily | 0.0% | 15.5% | 0.03 |
| EVN AG | Austria | | 0.20 | Daily | 62.3% | 25.0% | 0.13 |
| Hera SpA | Italy | | 0.52 | Daily | 76.9% | 24.0% | 0.33 |
| Iren SpA | Italy | | 0.64 | Daily | 119.8% | 24.0% | 0.34 |
| Pennon Group PLC | Britain | | 0.69 | Daily | 71.4% | 19.0% | 0.44 |
| Severn Trent PLC | Britain | | 0.66 | Daily | 92.7% | 19.0% | 0.38 |
| United Utilities Group PLC | Britain | | 0.70 | Daily | 106.8% | 19.0% | 0.38 |
| Median | | [3] | 0.64 | | 76.9% | | 0.38 |
| **Telecom Operators** | | | | | | | |
| Bouygues SA | France | | 0.89 | Daily | 32.0% | 27.9% | 0.72 |
| iliad SA | France | | 0.80 | Daily | 11.5% | 27.9% | 0.74 |
| NOS SGPS SA | Portugal | | 0.80 | Daily | 37.0% | 21.0% | 0.62 |
| Orange Belgium SA | Belgium | | 0.46 | Weekly | 7.0% | 27.1% | 0.44 |
| Sunrise Communications Group A | Switzerland | | 0.52 | Daily | 54.0% | 15.5% | 0.35 |
| Tele2 AB | Sweden | | 0.90 | Daily | 26.5% | 21.0% | 0.74 |
| Telefonica Deutschland Holding | Germany | | 0.69 | Daily | 11.5% | 30.0% | 0.64 |
| United Internet AG | Germany | | 0.90 | Daily | 18.0% | 30.0% | 0.80 |
| Vodafone Group PLC | Britain | | 0.98 | Daily | 46.6% | 19.0% | 0.71 |
| Median | | [4] | 0.80 | | 26.5% | | 0.71 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[E]: [A]/(1+(1-[D])*[C]).

**TABLE 27: EQUITY AND ASSET BETAS FOR THE 2019 WACC**

| | | Equity Beta [A] | Beta chosen [B] | Gearing (D/E) [C] | Tax Rate [D] | Asset Beta [E] |
|---|---|---|---|---|---|---|
| **Power Generation** | | | | | | |
| A2A SpA | Austria | 0.83 | Daily | 73.2% | 25.0% | 0.54 |
| Albioma SA | Britain | 0.71 | Weekly | 101.8% | 19.0% | 0.39 |
| Drax Group PLC | Britain | 1.24 | Weekly | 19.5% | 19.0% | 1.07 |
| Edison SpA | France | 0.54 | Daily | 18.6% | 27.9% | 0.48 |
| EDP Renovaveis SA | France | 0.63 | Daily | 52.6% | 27.9% | 0.46 |
| Electricite de France SA | France | 1.18 | Daily | 126.7% | 27.9% | 0.62 |
| Endesa SA | France | 0.58 | Daily | 23.0% | 27.9% | 0.50 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Engie SA | Germany | | 0.98 | Daily | 71.7% | 30.0% | 0.65 |
| ERG SpA | Italy | | 0.78 | Daily | 76.9% | 24.0% | 0.50 |
| Falck Renewables SpA | Italy | | 1.18 | Daily | 154.4% | 24.0% | 0.55 |
| Iberdrola SA | Italy | | 0.72 | Daily | 76.2% | 24.0% | 0.46 |
| OMV AG | Italy | | 0.99 | Daily | 21.3% | 24.0% | 0.85 |
| RWE AG | Norway | | 1.22 | Daily | 70.1% | 22.0% | 0.79 |
| Scatec ASA | Spain | | 0.85 | Daily | 121.7% | 25.0% | 0.45 |
| SSE PLC | Spain | | 0.81 | Daily | 52.3% | 25.0% | 0.58 |
| Verbund AG | Spain | | 0.78 | Weekly | 44.1% | 25.0% | 0.58 |
| Voltalia SA | Austria | | 0.19 | Daily | 87.5% | 25.0% | 0.12 |
| Median | | [1] | 0.81 | | 71.7% | | 0.54 |
| **Networks** | | | | | | | |
| Elia Group SA/NV | Belgium | | 0.29 | Daily | 98.2% | 27.1% | 0.17 |
| Enagas SA | Italy | | 0.58 | Daily | 82.5% | 24.0% | 0.36 |
| Red Electrica Corp SA | Italy | | 0.16 | Daily | 57.1% | 24.0% | 0.11 |
| REN - Redes Energeticas Nacion | Portugal | | 0.47 | Daily | 172.3% | 21.0% | 0.20 |
| Snam SpA | Spain | | 0.56 | Weekly | 83.4% | 25.0% | 0.34 |
| Terna - Rete Elettrica Naziona | Spain | | 0.57 | Weekly | 85.7% | 25.0% | 0.35 |
| Median | | [2] | 0.52 | | 84.5% | | 0.27 |
| **Utilities** | | | | | | | |
| ACEA SpA | Austria | | 0.72 | Daily | 85.6% | 25.0% | 0.44 |
| Ascopiave SpA | Britain | | 0.59 | Daily | 11.2% | 19.0% | 0.54 |
| Athens Water Supply & Sewage C | Britain | | 0.77 | Weekly | 0.0% | 19.0% | 0.77 |
| BKW AG | Britain | | 0.29 | Daily | 16.4% | 19.0% | 0.26 |
| Centrica PLC | Britain | | 0.90 | Daily | 41.0% | 19.0% | 0.67 |
| Enel SpA | Greece | | 0.79 | Weekly | 98.4% | 24.8% | 0.45 |
| Energiedienst Holding AG | Italy | | -0.04 | Daily | 0.0% | 24.0% | -0.04 |
| EVN AG | Italy | | 0.26 | Daily | 45.7% | 24.0% | 0.19 |
| Hera SpA | Italy | | 0.55 | Daily | 72.0% | 24.0% | 0.36 |
| Iren SpA | Italy | | 0.69 | Daily | 103.0% | 24.0% | 0.39 |
| Pennon Group PLC | Italy | | 0.64 | Daily | 81.2% | 24.0% | 0.39 |
| Severn Trent PLC | Switzerland | | 0.59 | Daily | 102.7% | 15.5% | 0.31 |
| United Utilities Group PLC | Switzerland | | 0.60 | Daily | 123.0% | 15.5% | 0.29 |
| Median | | [3] | 0.60 | | 72.0% | | 0.39 |
| **Telecom Operators** | | | | | | | |
| Bouygues SA | Belgium | | 1.01 | Daily | 31.5% | 27.1% | 0.82 |
| iliad SA | Britain | | 0.80 | Daily | 20.2% | 19.0% | 0.69 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NOS SGPS SA | France | | 0.80 | Daily | 41.1% | 27.9% | 0.62 |
| Orange Belgium SA | Germany | | 0.60 | Weekly | 17.5% | 30.0% | 0.54 |
| Sunrise Communications Group A | Germany | | 0.56 | Daily | 44.3% | 30.0% | 0.43 |
| Tele2 AB | Portugal | | 0.86 | Daily | 27.2% | 21.0% | 0.71 |
| Telefonica Deutschland Holding | Sweden | | 0.70 | Daily | 13.4% | 21.0% | 0.64 |
| United Internet AG | Switzerland | | 0.97 | Daily | 19.3% | 15.5% | 0.83 |
| Vodafone Group PLC | France | | 0.98 | Daily | 50.6% | 27.9% | 0.72 |
| Median | | [4] | 0.80 | | 27.2% | | 0.69 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[E]: [A]/(1+(1-[D])*[C]).

**TABLE 28: EQUITY AND ASSET BETAS FOR THE 2020 WACC**

| | | | Equity Beta [A] | Beta chosen [B] | Gearing (D/E) [C] | Tax Rate [D] | Asset Beta [E] |
|---|---|---|---|---|---|---|---|
| **Power Generation** | | | | | | | |
| A2A SpA | Italy | | 0.98 | Daily | 69.7% | 24.0% | 0.64 |
| Albioma SA | France | | 0.97 | Weekly | 86.4% | 27.9% | 0.60 |
| Drax Group PLC | Britain | | 1.36 | Weekly | 53.4% | 19.0% | 0.95 |
| Edison SpA | Italy | | 0.51 | Daily | 8.2% | 24.0% | 0.48 |
| EDP Renovaveis SA | Spain | | 0.70 | Weekly | 40.9% | 25.0% | 0.53 |
| Electricite de France SA | France | | 1.19 | Weekly | 102.9% | 27.9% | 0.68 |
| Encavis AG | Germany | | 0.90 | Daily | 136.8% | 30.0% | 0.46 |
| Endesa SA | Spain | | 0.97 | Weekly | 23.9% | 25.0% | 0.82 |
| Engie SA | France | | 1.25 | Weekly | 74.0% | 27.9% | 0.81 |
| ERG SpA | Italy | | 0.82 | Daily | 52.1% | 24.0% | 0.59 |
| Falck Renewables SpA | Italy | | 0.99 | Daily | 63.1% | 24.0% | 0.67 |
| Iberdrola SA | Spain | | 0.78 | Daily | 73.0% | 25.0% | 0.51 |
| OMV AG | Austria | | 1.48 | Daily | 20.3% | 25.0% | 1.28 |
| Orsted AS | Denmark | | 0.61 | Daily | 4.0% | 22.0% | 0.59 |
| RWE AG | Germany | | 0.98 | Daily | 13.5% | 30.0% | 0.90 |
| Scatec ASA | Norway | | 1.22 | Daily | 80.9% | 22.0% | 0.75 |
| SSE PLC | Britain | | 0.97 | Weekly | 71.4% | 19.0% | 0.61 |
| Uniper SE | Germany | | 0.72 | Daily | 15.4% | 30.0% | 0.65 |
| Verbund AG | Austria | | 1.04 | Daily | 14.7% | 25.0% | 0.93 |
| Voltalia SA | France | | 0.67 | Daily | 56.6% | 27.9% | 0.48 |
| Median | | [1] | 0.97 | | 55.0% | | 0.65 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Networks** | | | | | | | |
| Elia Group SA/NV | Belgium | | 0.66 | Daily | 105.0% | 27.1% | 0.37 |
| Enagas SA | Spain | | 0.73 | Daily | 78.3% | 25.0% | 0.46 |
| Red Electrica Corp SA | Spain | | 0.54 | Daily | 62.6% | 25.0% | 0.37 |
| REN - Redes Energeticas Nacion | Portugal | | 0.63 | Weekly | 163.8% | 21.0% | 0.27 |
| Snam SpA | Italy | | 0.92 | Daily | 82.7% | 24.0% | 0.57 |
| Terna - Rete Elettrica Naziona | Italy | | 0.72 | Weekly | 73.7% | 24.0% | 0.46 |
| Median | | [2] | 0.69 | | 80.5% | | 0.42 |
| **Utilities** | | | | | | | |
| ACEA SpA | Italy | | 0.76 | Daily | 86.6% | 24.0% | 0.46 |
| Ascopiave SpA | Italy | | 0.73 | Daily | 19.4% | 24.0% | 0.64 |
| Athens Water Supply & Sewage C | Greece | | 0.61 | Daily | 0.0% | 24.8% | 0.61 |
| Audax Renovables SA | Spain | | 1.14 | Daily | 33.5% | 25.0% | 0.91 |
| BKW AG | Switzerland | | 0.49 | Daily | 14.1% | 15.5% | 0.44 |
| Centrica PLC | Britain | | 1.22 | Daily | 83.3% | 19.0% | 0.73 |
| Enel SpA | Italy | | 0.96 | Daily | 84.3% | 24.0% | 0.59 |
| EVN AG | Austria | | 0.69 | Daily | 28.0% | 25.0% | 0.57 |
| Hera SpA | Italy | | 0.84 | Daily | 64.1% | 24.0% | 0.56 |
| Iren SpA | Italy | | 0.78 | Daily | 95.6% | 24.0% | 0.45 |
| Italgas SpA | Italy | | 0.77 | Daily | 96.6% | 24.0% | 0.44 |
| Pennon Group PLC | Britain | | 0.54 | Daily | 80.3% | 19.0% | 0.33 |
| Severn Trent PLC | Britain | | 0.57 | Daily | 117.0% | 19.0% | 0.29 |
| United Utilities Group PLC | Britain | | 0.60 | Daily | 136.7% | 19.0% | 0.29 |
| Median | | [3] | 0.75 | | 81.8% | | 0.51 |
| **Telecom Operators** | | | | | | | |
| Bouygues SA | France | | 1.40 | Daily | 43.4% | 27.9% | 1.07 |
| iliad SA | France | | 0.61 | Daily | 64.2% | 27.9% | 0.42 |
| NOS SGPS SA | Portugal | | 0.64 | Daily | 53.5% | 21.0% | 0.45 |
| Orange Belgium SA | Belgium | | 0.75 | Weekly | 41.2% | 27.1% | 0.58 |
| Tele2 AB | Sweden | | 0.78 | Daily | 29.8% | 21.0% | 0.63 |
| Telefonica Deutschland Holding | Germany | | 0.59 | Daily | 40.3% | 30.0% | 0.46 |
| United Internet AG | Germany | | 0.93 | Daily | 24.4% | 30.0% | 0.79 |
| Vodafone Group PLC | Britain | | 0.98 | Daily | 93.5% | 19.0% | 0.56 |
| Median | | [4] | 0.77 | | 42.3% | | 0.57 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[E]: [A]/(1+(1-[D])*[C]).

**TABLE 29: EQUITY AND ASSET BETAS FOR THE 2021 WACC**

| | | | Equity Beta [A] | Beta Chosen [B] | Gearing (D/E) [C] | Tax Rate [D] | Asset Beta [E] |
|---|---|---|---|---|---|---|---|
| **Power Generation** | | | | | | | |
| A2A SpA | Italy | | 0.98 | Daily | 69.7% | 24.0% | 0.64 |
| Albioma SA | France | | 0.97 | Weekly | 86.4% | 27.9% | 0.60 |
| Drax Group PLC | Britain | | 1.36 | Weekly | 53.4% | 19.0% | 0.95 |
| Edison SpA | Italy | | 0.51 | Daily | 8.2% | 24.0% | 0.48 |
| EDP Renovaveis SA | Spain | | 0.70 | Weekly | 40.9% | 25.0% | 0.53 |
| Electricite de France SA | France | | 1.19 | Weekly | 102.9% | 27.9% | 0.68 |
| Encavis AG | Germany | | 0.90 | Daily | 136.8% | 30.0% | 0.46 |
| Endesa SA | Spain | | 0.97 | Weekly | 23.9% | 25.0% | 0.82 |
| Engie SA | France | | 1.25 | Weekly | 74.0% | 27.9% | 0.81 |
| ERG SpA | Italy | | 0.82 | Daily | 52.1% | 24.0% | 0.59 |
| Falck Renewables SpA | Italy | | 0.99 | Daily | 63.1% | 24.0% | 0.67 |
| Iberdrola SA | Spain | | 0.78 | Daily | 73.0% | 25.0% | 0.51 |
| OMV AG | Austria | | 1.48 | Daily | 20.3% | 25.0% | 1.28 |
| Orsted AS | Denmark | | 0.61 | Daily | 4.0% | 22.0% | 0.59 |
| RWE AG | Germany | | 0.98 | Daily | 13.5% | 30.0% | 0.90 |
| Scatec ASA | Norway | | 1.22 | Daily | 80.9% | 22.0% | 0.75 |
| SSE PLC | Britain | | 0.97 | Weekly | 71.4% | 19.0% | 0.61 |
| Uniper SE | Germany | | 0.72 | Daily | 15.4% | 30.0% | 0.65 |
| Verbund AG | Austria | | 1.04 | Daily | 14.7% | 25.0% | 0.93 |
| Voltalia SA | France | | 0.67 | Daily | 56.6% | 27.9% | 0.48 |
| Median | | [1] | 0.97 | | 55.0% | | 0.65 |
| **Networks** | | | | | | | |
| Elia Group SA/NV | Belgium | | 0.66 | Daily | 105.0% | 27.1% | 0.37 |
| Enagas SA | Spain | | 0.73 | Daily | 78.3% | 25.0% | 0.46 |
| Red Electrica Corp SA | Spain | | 0.54 | Daily | 62.6% | 25.0% | 0.37 |
| REN - Redes Energeticas Nacion | Portugal | | 0.63 | Weekly | 163.8% | 21.0% | 0.27 |
| Snam SpA | Italy | | 0.92 | Daily | 82.7% | 24.0% | 0.57 |
| Terna - Rete Elettrica Naziona | Italy | | 0.72 | Weekly | 73.7% | 24.0% | 0.46 |
| Median | | [2] | 0.69 | | 80.5% | | 0.42 |
| **Utilities** | | | | | | | |
| ACEA SpA | Italy | | 0.76 | Daily | 86.6% | 24.0% | 0.46 |
| Ascopiave SpA | Italy | | 0.73 | Daily | 19.4% | 24.0% | 0.64 |
| Athens Water Supply & Sewage C | Greece | | 0.61 | Daily | 0.0% | 24.8% | 0.61 |
| Audax Renovables SA | Spain | | 1.14 | Daily | 33.5% | 25.0% | 0.91 |
| BKW AG | Switzerland | | 0.49 | Daily | 14.1% | 15.5% | 0.44 |
| Centrica PLC | Britain | | 1.22 | Daily | 83.3% | 19.0% | 0.73 |
| Enel SpA | Italy | | 0.96 | Daily | 84.3% | 24.0% | 0.59 |
| EVN AG | Austria | | 0.69 | Daily | 28.0% | 25.0% | 0.57 |
| Hera SpA | Italy | | 0.84 | Daily | 64.1% | 24.0% | 0.56 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Iren SpA | Italy | | 0.78 | Daily | 95.6% | 24.0% | 0.45 |
| Italgas SpA | Italy | | 0.77 | Daily | 96.6% | 24.0% | 0.44 |
| Pennon Group PLC | Britain | | 0.54 | Daily | 80.3% | 19.0% | 0.33 |
| Severn Trent PLC | Britain | | 0.57 | Daily | 117.0% | 19.0% | 0.29 |
| United Utilities Group PLC | Britain | | 0.60 | Daily | 136.7% | 19.0% | 0.29 |
| Median | | [3] | 0.75 | | 81.8% | | 0.51 |
| **Telecom Operators** | | | | | | | |
| Gamma Communications PLC | Britain | | 0.38 | Daily | 0.0% | 19.0% | 0.38 |
| Bouygues SA | France | | 1.40 | Daily | 43.4% | 27.9% | 1.07 |
| NOS SGPS SA | Portugal | | 0.64 | Daily | 53.5% | 21.0% | 0.45 |
| Orange Belgium SA | Belgium | | 0.75 | Weekly | 41.2% | 27.1% | 0.58 |
| Tele2 AB | Sweden | | 0.78 | Daily | 29.8% | 21.0% | 0.63 |
| Telefonica Deutschland Holding | Germany | | 0.59 | Daily | 40.3% | 30.0% | 0.46 |
| United Internet AG | Germany | | 0.93 | Daily | 24.4% | 30.0% | 0.79 |
| Vodafone Group PLC | Britain | | 0.98 | Daily | 93.5% | 19.0% | 0.56 |
| iliad SA | France | | 0.61 | Daily | 64.2% | 27.9% | 0.42 |
| Median | | [4] | 0.75 | | 41.2% | | 0.56 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[E]: [A]/(1+(1-[D])*[C]).

**TABLE 30: EQUITY AND ASSET BETAS FOR THE 2022 WACC**

| | | Equity Beta [A] | Beta Chosen [B] | Gearing (D/E) [C] | Tax Rate [D] | Asset Beta [E] |
|---|---|---|---|---|---|---|
| **Power Generation** | | | | | | |
| A2A SpA | Italy | 1.00 | Daily | 71.1% | 24.0% | 0.65 |
| Albioma SA | France | 0.76 | Daily | 77.3% | 27.9% | 0.49 |
| Drax Group PLC | Britain | 1.26 | Weekly | 62.4% | 19.0% | 0.84 |
| Edison SpA | Italy | 0.52 | Daily | 9.0% | 24.0% | 0.48 |
| EDP Renovaveis SA | Spain | 0.76 | Weekly | 33.4% | 25.0% | 0.61 |
| Electricite de France SA | France | 1.25 | Weekly | 112.6% | 27.9% | 0.69 |
| Encavis AG | Germany | 0.98 | Daily | 104.9% | 30.0% | 0.56 |
| Endesa SA | Spain | 0.81 | Daily | 26.2% | 25.0% | 0.67 |
| Engie SA | France | 1.21 | Weekly | 77.8% | 27.9% | 0.77 |
| ERG SpA | Italy | 0.79 | Daily | 49.9% | 24.0% | 0.58 |
| Iberdrola SA | Spain | 0.80 | Daily | 67.6% | 25.0% | 0.53 |
| OMV AG | Austria | 1.47 | Daily | 26.8% | 25.0% | 1.23 |
| Orsted AS | Denmark | 0.66 | Daily | 4.2% | 22.0% | 0.64 |
| RWE AG | Germany | 0.96 | Daily | 3.0% | 30.0% | 0.94 |
| Scatec ASA | Norway | 1.32 | Daily | 56.5% | 22.0% | 0.91 |
| SSE PLC | Britain | 1.00 | Weekly | 66.8% | 19.0% | 0.65 |
| Uniper SE | Germany | 0.70 | Daily | 16.4% | 30.0% | 0.63 |
| Verbund AG | Austria | 1.00 | Daily | 9.1% | 25.0% | 0.94 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Voltalia SA | France | | 0.72 | Daily | 42.8% | 27.9% | 0.55 |
| Median | | [1] | 0.96 | | 49.9% | | 0.65 |
| **Networks** | | | | | | | |
| Elia Group SA/NV | Belgium | | 0.68 | Daily | 99.6% | 27.1% | 0.39 |
| Enagas SA | Spain | | 0.69 | Daily | 78.8% | 25.0% | 0.43 |
| Red Electrica Corp SA | Spain | | 0.50 | Daily | 68.8% | 25.0% | 0.33 |
| REN - Redes Energeticas Nacion | Portugal | | 0.47 | Daily | 162.0% | 21.0% | 0.21 |
| Snam SpA | Italy | | 0.88 | Daily | 81.1% | 24.0% | 0.54 |
| Terna - Rete Elettrica Naziona | Italy | | 0.72 | Weekly | 70.8% | 24.0% | 0.47 |
| Median | | [2] | 0.68 | | 79.9% | | 0.41 |
| **Utilities** | | | | | | | |
| ACEA SpA | Italy | | 0.73 | Daily | 88.1% | 24.0% | 0.44 |
| Ascopiave SpA | Italy | | 0.68 | Daily | 28.6% | 24.0% | 0.56 |
| Athens Water Supply & Sewage C | Greece | | 0.62 | Daily | 0.0% | 24.8% | 0.62 |
| Audax Renovables SA | Spain | | 1.05 | Daily | 28.0% | 25.0% | 0.87 |
| BKW AG | Switzerland | | 0.52 | Daily | 13.0% | 15.5% | 0.47 |
| Centrica PLC | Britain | | 1.24 | Daily | 89.5% | 19.0% | 0.72 |
| Elmera Group ASA | Norway | | 0.93 | Daily | 3.4% | 22.0% | 0.91 |
| Enel SpA | Italy | | 0.98 | Daily | 74.4% | 24.0% | 0.63 |
| EVN AG | Austria | | 0.73 | Daily | 24.2% | 25.0% | 0.62 |
| Hera SpA | Italy | | 0.85 | Daily | 63.1% | 24.0% | 0.57 |
| Iren SpA | Italy | | 0.75 | Daily | 99.2% | 24.0% | 0.43 |
| Italgas SpA | Italy | | 0.74 | Daily | 100.9% | 24.0% | 0.42 |
| Pennon Group PLC | Britain | | 0.50 | Daily | 55.2% | 19.0% | 0.34 |
| Severn Trent PLC | Britain | | 0.54 | Daily | 110.8% | 19.0% | 0.28 |
| United Utilities Group PLC | Britain | | 0.57 | Daily | 125.8% | 19.0% | 0.28 |
| Median | | [3] | 0.73 | | 63.1% | | 0.56 |
| **Telecom Operators** | | | | | | | |
| Bouygues SA | France | | 1.35 | Daily | 42.2% | 27.9% | 1.04 |
| Gamma Communications PLC | Britain | | 0.34 | Daily | 0.0% | 19.0% | 0.34 |
| NOS SGPS SA | Portugal | | 0.60 | Daily | 66.2% | 21.0% | 0.39 |
| Orange Belgium SA | Belgium | | 0.75 | Weekly | 42.7% | 27.1% | 0.57 |
| Tele2 AB | Sweden | | 0.79 | Daily | 34.8% | 21.0% | 0.62 |
| Telefonica Deutschland Holding | Germany | | 0.58 | Daily | 54.5% | 30.0% | 0.42 |
| United Internet AG | Germany | | 0.85 | Daily | 26.1% | 30.0% | 0.72 |
| Vodafone Group PLC | Britain | | 0.96 | Daily | 122.2% | 19.0% | 0.48 |
| Median | | [4] | 0.77 | | 42.5% | | 0.53 |

Notes:
[A], [B]: Brattle analysis of Bloomberg data.
[C]: KPMG.
[E]: [A]/(1+(1-[D])*[C]).

**TABLE 31: ASSET BETA FOR THE HEATING COMPANIES, BY YEAR**

| | | WACC Period | | | | |
|---|---|---|---|---|---|---|
| | | 2018 | 2019 | 2020 | 2021 | 2022 |
| **Asset Beta** | | | | | | |
| Power Generation | [1] | 0.51 | 0.54 | 0.65 | 0.65 | 0.65 |
| Networks | [2] | 0.28 | 0.27 | 0.42 | 0.42 | 0.41 |
| Utilities | [3] | 0.38 | 0.39 | 0.51 | 0.51 | 0.56 |
| Telecom Operators | [4] | 0.71 | 0.69 | 0.57 | 0.56 | 0.53 |
| **Beta for Heating Sector** | **[5]** | 0.47 | 0.47 | 0.54 | 0.53 | 0.54 |

Notes: Weights for the heating sector are assumed to be equal to 25% across all groups.