



Climate Scenario Analysis

Company.Name

Report Start.Year

Executive Summary

Company.Name

This report by 2° Investing Initiative provides an assessment of **Company.Name**'s, power capacity by technology, its future alignment with climate transition pathways and evaluates its performance against other US utilities.

Capacity Start Year

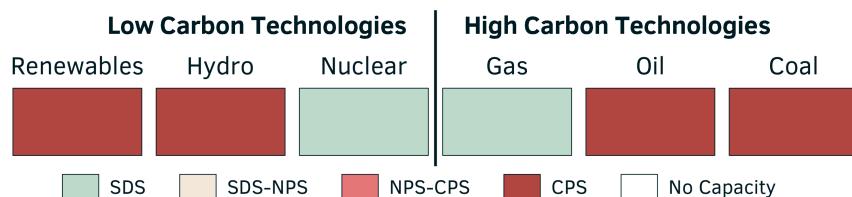
Company.Name has CapInstalled GW of installed capacity with LowCPercentInstalled% coming from low carbon technologies.

By End.Year, it intends to add CapAdd GW of which LowCpercAdd% is low carbon.

	Renewables	Hydro	Nuclear	Gas	Oil	Coal
Existing Production (MW)	3,516	3,803	9,259	20,190	3,127	17,934
Net Additions (MW) 2018-2023	0	0	0	698	280	0

Comparison of the company investment plans with the Select.Scenario

Company.Name's planned capacity additions and reductions align with the different climate scenarios of the IEA and, by extension, different temperature rise estimates. The company's coal investment plan is aligned with the Sustainable Development Scenario, while its renewables investment plan is aligned with the Current Policy Scenario.



Select.Scenario Alignment Requirements by End.Year

In order to align with a Sustainable Development Scenario (Select.Scenario) by End.Year, **Company.Name** would require the following changes in capacity by technology in addition to their current plans by End.Year:

	Renewables	Hydro	Nuclear	Gas	Oil	Coal
Existing Production (MW)	3,516	3,803	9,259	20,888	3,407	17,934
Net Additions (MW) 2018-2023	18,440	383	-1	1,491	-1,409	-3,645

Introduction

Key Questions

This climate scenario report addresses five key questions regarding the **Company.Name**'s climate strategy:

1. How does the company's current energy mix compare to the power market's energy mix?
(Section 2)
2. How do the company's investment plans compare to different climate transition scenarios?
(Section 3)
3. How does the company's planned energy mix by End.Year compare to the scenario-aligned market?
(Section 4)
4. How can the company adjust its investment plans to align with the B2DS by End.Year?
(Section 5)
5. How does the company's climate alignment compare to other utilities?
(Section 6)

This document presents solely the results of this analysis. For more information on the methodology, scenarios, underlying data, and limitations, please refer to "A Guide to Company Scenario Analysis" available at www.transitionmonitor.com.

Why is scenario analysis important?

Scenario analysis is highlighted within by the Task Force for Climate related Financial Disclosures (TCFD) as a recommended tool for understanding the resilience of organization's strategies under different climate related scenarios. It supports both companies and investors in developing action plans as a response to the Paris Agreement.

How does this scenario analysis work?

This scenario analysis is based on a data analysis of the physical assets owned by **Company.Name** and their investment plans in new capacity. The share of responsibility, defined through climate scenarios that outline possible transition pathways, has been allocated to the company according to its regional distribution of power capacity. This is then aggregated up to understand how **Company.Name** is currently, and in the future, exposed to climate transition risk and opportunity.

How can it be used?

For **Companies** this analysis provides a comparison to peers and an understanding of how their climate change response may differ. It also provides an overview of the alignment of planned capacity changes compared to the climate scenarios developed by the International Energy Agency (IEA). It highlights potential areas for action for companies.

For **Investors** this report may be used to inform their decision making by highlighting the alignment of the trajectories of companies in their portfolio with different climate scenarios and therefore their exposure to transition risk. The information provided in this report can support engagement activities with companies and may provide data for reporting requirements.

For other stakeholders, such as policy makers, or NGOs, this may support the development of guidelines for reporting or research.

What this report doesn't do: this report is not a financial analysis of the company and should not be taken as investment advice.

Data used in this report may vary from what is announced by the company in annual reports; this data in this report reflects an aggregation of the known subsidiaries of **Company.Name** aggregated under the equity share principle. Details regarding the data validation process can be found in page 16. Companies are invited to review the data and provide feedback to assist in improving the underlying data sets.

Reading the Report

Report Contents

This report consists of four elements:

1. **Company profile:** information about the current installed capacity of the company, its technology mix and its global capacity distribution.
2. **Scenario Analysis:** results of the comparison of the company investment plans to different scenarios and the market.
3. **Peer Comparison:** a comparison of the scenario analysis results to the peers operating in the same market.
4. **Emissions Intensity:** a comparison of the emissions intensity of **Company.Name** with the scenarios and peers.

Key Concepts

To understand the results presented in this report, some of the key concepts are summarised below. For detailed information about the methodology, scenarios and underlying data, please refer to "A Guide to Company Scenario Analysis" available at www.transitionmonitor.com.

Low carbon technologies: This report treats renewables, hydro and nuclear as low carbon technologies, and gas, oil and coal capacity to be high carbon technologies. Renewable technologies include solar, wind and biomass. While acknowledging other sustainability issues linked to different technologies, this report comments on the low vs high carbon split only.

Capacity Build Out: Refers to the investment plans of the company in new power capacity.

Capacity vs Generation: This report uses capacity (MW) rather than generation (MWh) as a metric. The generation of electricity from each technology differs by a capacity factor that varies due to a multitude of factors.

Energy mix: The distribution of the power capacity of **Company.Name** is used as an indicator. This refers to the share of installed capacity that Duke Energy Corporation has in each technology.

Market: The market in this report refers to the other utilities operating in the country of domicile of **Company.Name**. In this case that is US utilities.

Aligned with a scenario: To be aligned with a scenario implies that the capacity build out of the company matches what is expected from the roadmaps, which in this case are developed by the IEA.

Scenarios: Three IEA scenarios have been incorporated into this report from the World Energy Outlook 2018 (WEO2018), which are detailed in Table 1. These have been chosen due to their regional and technological granularity. Select.Scenario is used as the benchmark scenario. The scenarios consist of technology road maps that outline the technological changes required in each designated region globally. These roadmaps have been applied to each asset to calculate the change that would be required by asset. This is aggregated to the region and then the company to determine the overall expected change.

Table 1: Details about the IEA scenarios used in the report. The expected correlated temperature increase is sourced from WEO 2018.

Scenario Full Name	Abbreviation	Expected correlated temperature increase	Source
Beyond 2° Scenario	B2DS	<1.75°C	ETP 2017
Sustainable Development Scenario	SDS	1.7-2°C	WEO 2018
New Policy Scenario	NPS	2.7°C	WEO 2018
Current Policy Scenario	CPS	3.0-3.5°C	WEO 2018

Company Profile

This section outlines the current and future energy mix and capacity distribution of **Company.Name**. Figure 1 shows the changes in capacity in each technology between Start.Year and End.Year. From this, it is possible to establish whether the company's transition risks increase or decrease. Figure 1.2 and 1.3 show the geographical distribution of power generation assets by capacity and energy mix.

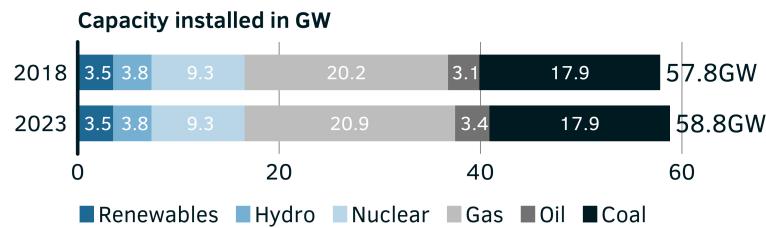


Figure 1.1: Company energy mix in Start.Year and End.Year.

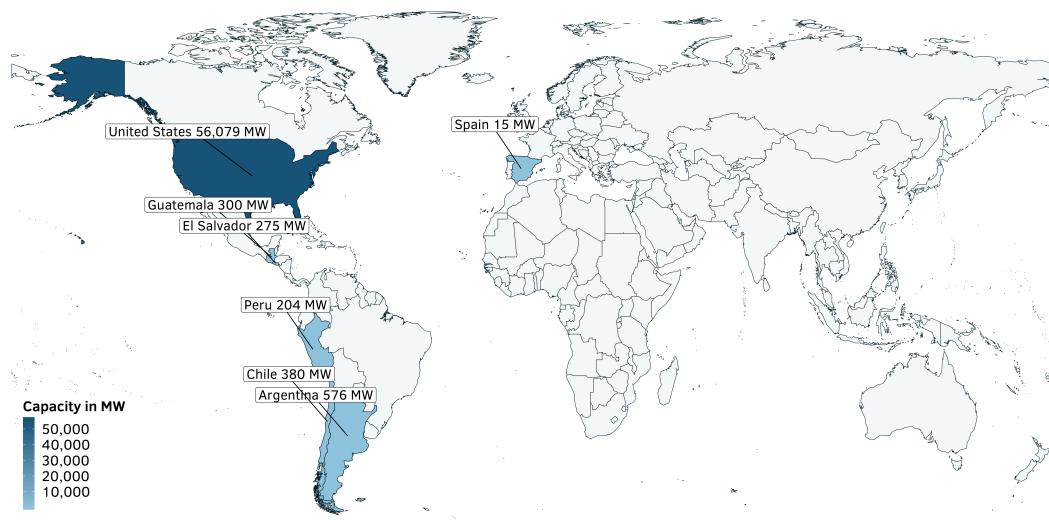


Figure 1.2: Geographical distribution of the company's power generating assets in Start.Year.

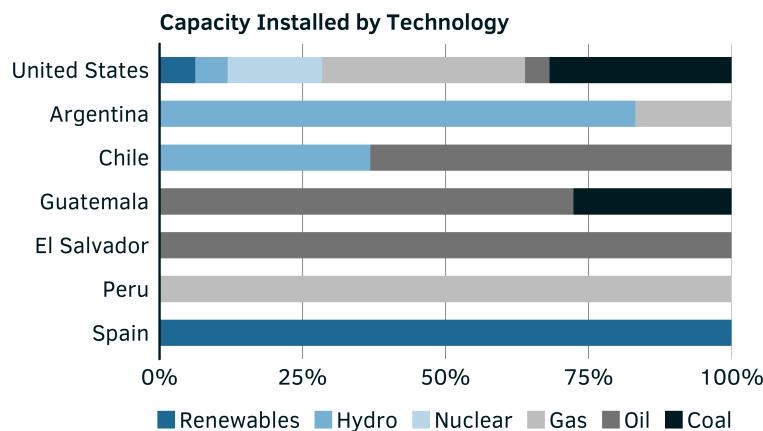


Figure 1.3: Overview of the company's energy mix in the largest countries by production in Start.Year ranked by production.

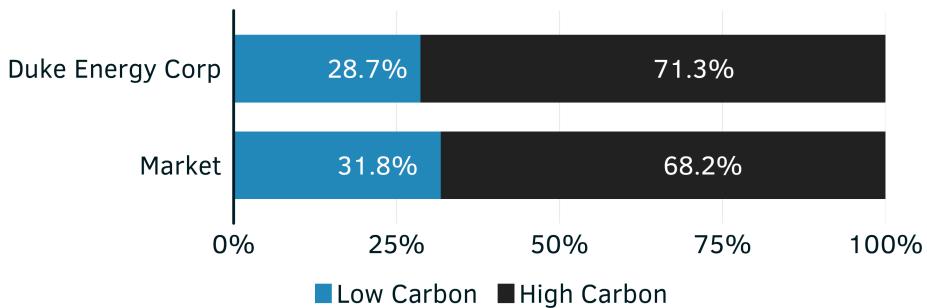
Current Alignment

How does the current energy mix of Company.Name compare to the market?

This section provides an overview of the diversification of **Company.Name** energy mix across high and low carbon technologies. In order to meet the goals of the Paris Agreement, the IEA broadly signals that the share of “low carbon technologies” must increase while the share of “high carbon technologies” must decrease.

As such, a company which currently has a higher share of a low carbon technology in its energy mix than the market is deemed to be “outperforming” the market and “underperforming” if it has a lower share. Conversely, a company which has a higher share of a high carbon technology in its energy mix than the market is deemed to be “underperforming” the market, and “outperforming” it if it has a lower share.

A) Low and high carbon energy mix in percent



B) Energy mix by technology in percent

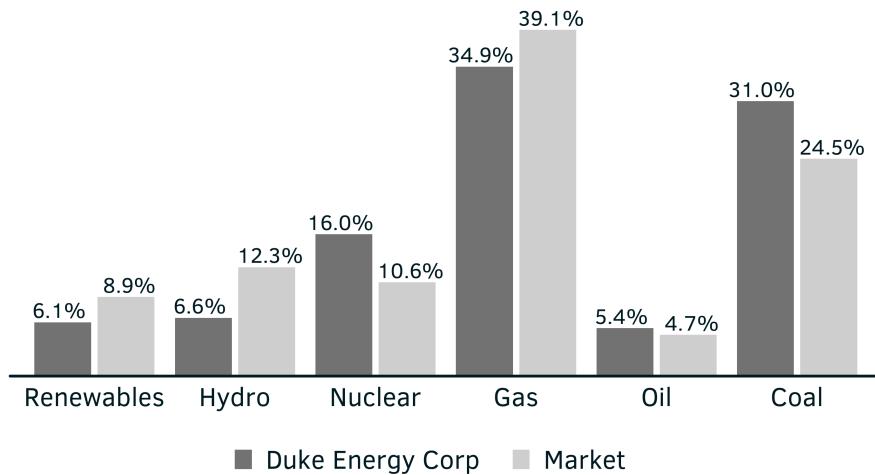


Figure 2.1: Comparison of the company energy mix to the market energy mix in Start.Year by A) low carbon vs high carbon split and B) by technology.

Company.Name has 52% of their power capacity in low carbon technologies compared to 36% in the market. **Company.Name** is more exposed to hydro, nuclear and coal capacity than the market; they are less exposed to renewables, gas and oil capacity than the market.

The metric for comparison is the percent share that each technology contributes to the total power capacity; the values for the market and for the company each sum to 100%. If one technology has a higher weight in the mix, this is consequently reflected in the results for the other technologies.

Trajectory

How do the capital expenditure plans for different technologies compare to the climate scenarios?

Plans to build or retire capacity over the next 5 years can be used to compare **Company.Name** to different International Energy Agency (IEA) scenarios. These scenarios present possible transition pathways and the changes in capacity required if each company in the world were to align its production accordingly.

The expected change in capacity by technology as per the IEA scenarios has been applied to the power capacity of **Company.Name** to calculate the changes required under each scenario. This report benchmarks the company against the Sustainable Development Scenario (Select.Scenario), though the following charts also show the New Policy Scenario (NPS) and the Current Policy Scenario (CPS).

Alignment with climate scenarios varies by technology. For each technology, figure 3.1 summarises the temperature rise estimates that **Company.Name**'s investment plan aligns with based on different IEA scenarios. It is important to note that these charts are independent of the current exposure to each technology (except by determining the starting point in terms of capacity). The initial (Start.Year) weighting of a technology within the company's energy mix is not reflected in these charts.

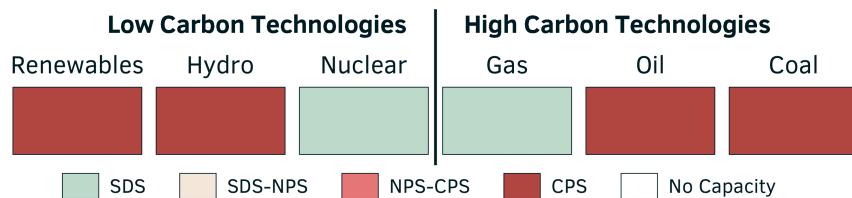


Figure 3.1: Scenario outcome of the build out plans for each technology by End.Year.

The additional capacity planned by Company.Name put them on track with the Select.Scenario for gas and coal capacity, and the CPS for renewables, hydro, nuclear and oil capacity.

The charts on the following page (figure 3.2) provide additional details on how **Company.Name**'s investment plans for each technology align with four IEA scenarios over the next five years. They also show the market's trajectory for context.

Annotation

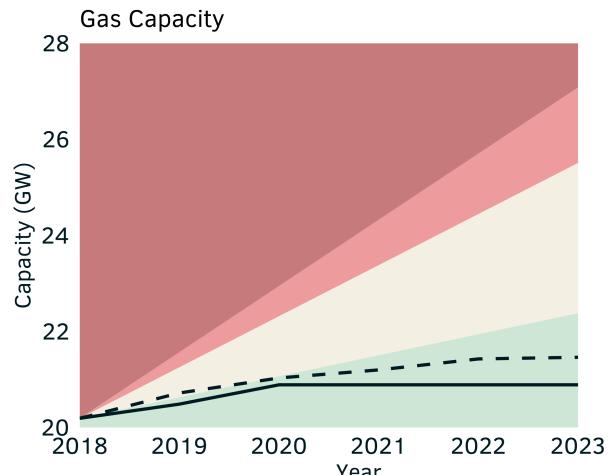
The background colours represent how the trajectory of each technology should progress under the relevant scenario.

The solid and dashed lines represent the company and the utility market in which it operates, respectively.

The alignment of the company investment plans can be read by comparing between which scenario lines the company line falls.

In the example chart to the right, the market is on track slightly below the Select.Scenario by End.Year.

The tile chart above summarises where the company rates on each technology.



Trajectory

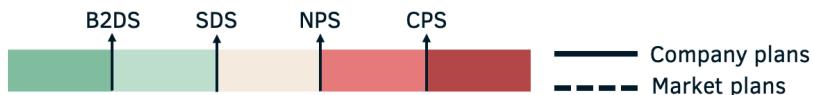
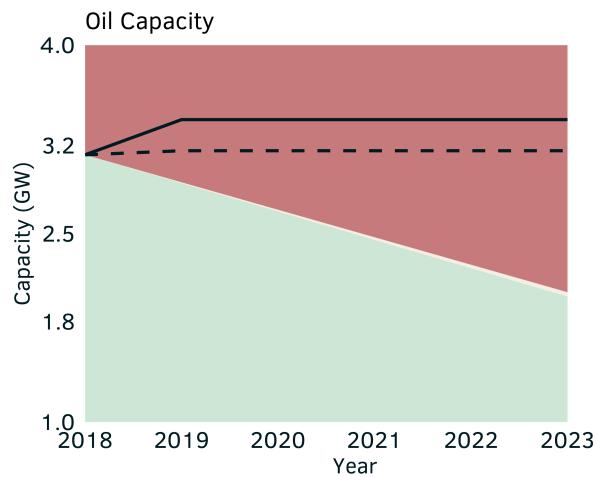
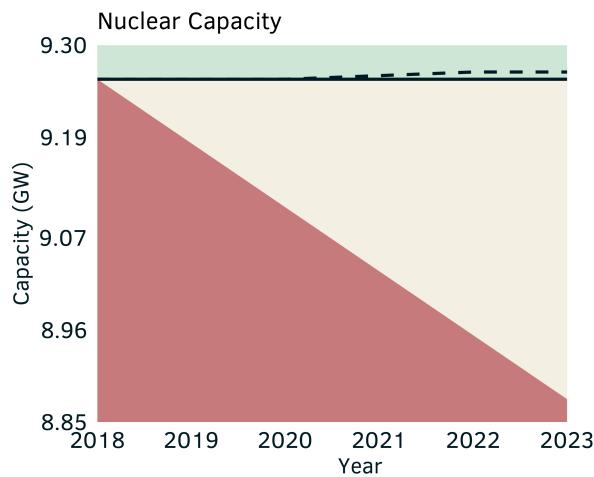
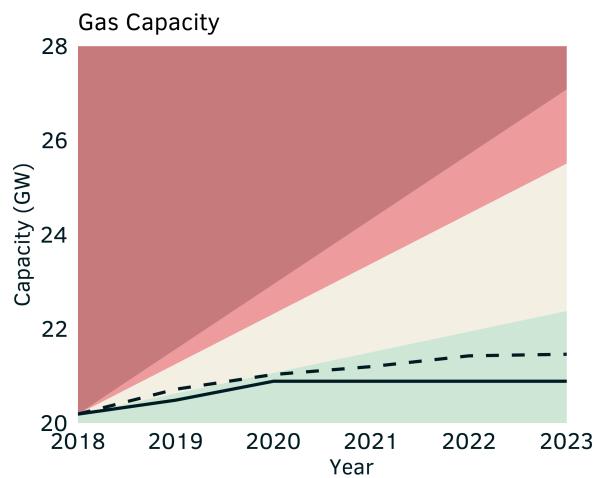
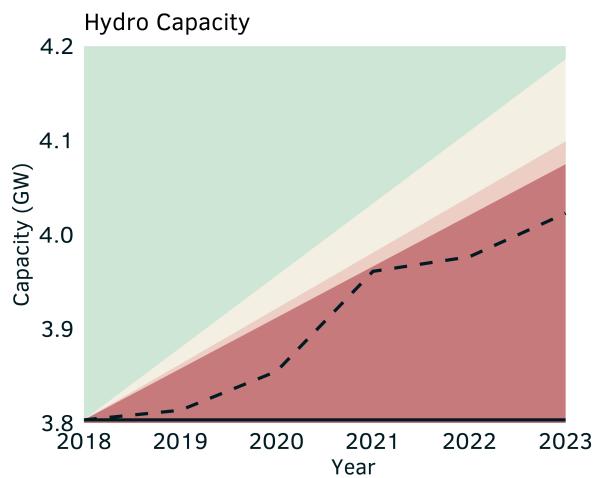
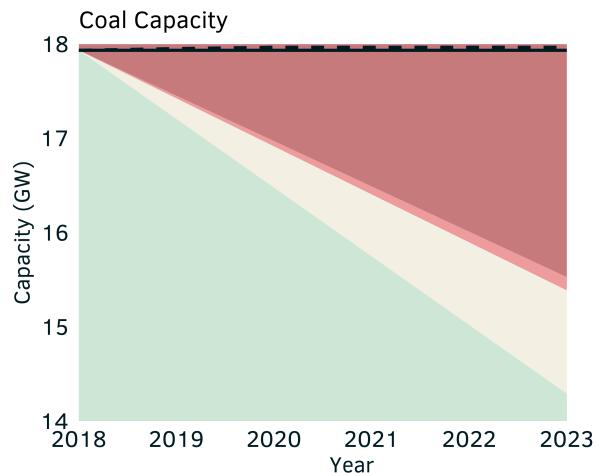
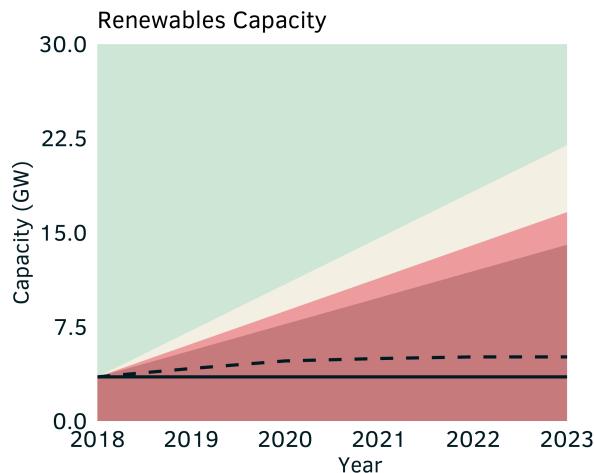


Figure 3.2: illustrates how **Company.Name**'s planned capacity adjustments in each technology compare to different IEA transition pathways and the market.

Future Alignment

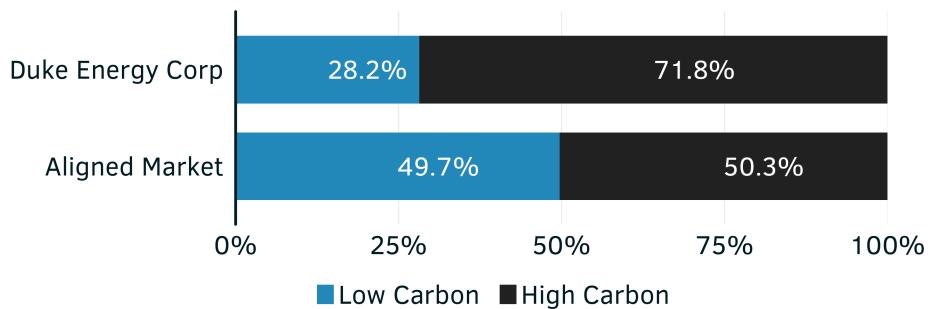
How will the planned energy mix of Company.Name compare to the US utility market aligned with the Select.Scenario in End.Year?

The energy mix of **Company.Name** in End.Year is based on its energy mix in Start.Year plus planned capacity adjustments between Start.Year and End.Year. The aligned market energy mix shows what would be expected if the US power market were to develop in accordance with the Select.Scenario.

If the company has less low carbon technologies than a theoretical aligned benchmark, it may be exposed to higher transition risks based on the technological trajectories outlined by the IEA.

Figure 4 shows that **Company.Name** has 0.2% more low carbon capacity than the aligned Market.

A) Low and high carbon energy mix in percent



B) Energy mix by technology in percent

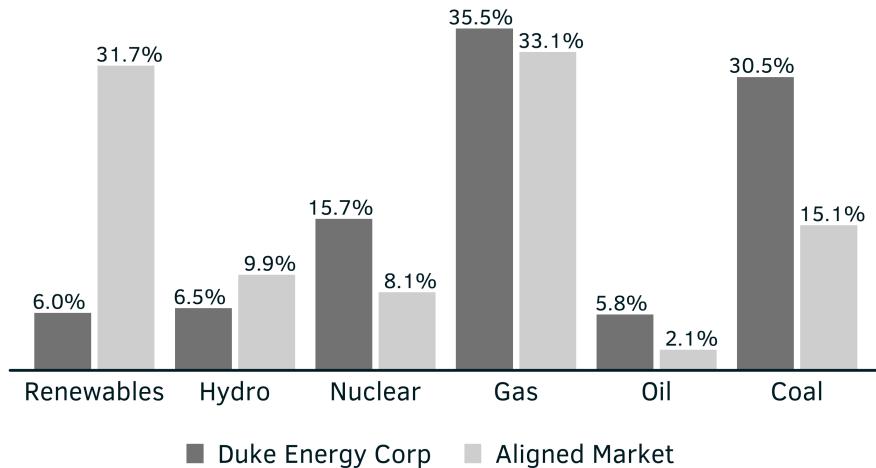


Figure 4.1: Comparison of the company energy mix to the market energy mix in End.Year.

Company.Name has a lower share of renewable and gas capacity compared to the market under the Select.Scenario by End.Year; it has a higher share of hydro, nuclear, oil and coal capacity compared to the market aligned with the Select.Scenario.

The comparison in the chart above is the percent share that each technology contributes to the total power capacity. As these shares sum to 100%, in the case that one technology has a high weight in the power mix, other technologies may appear underweighted in comparison to the aligned market.

Achieving Alignment

What changes in capacity are required by Company.Name to align itself with the Select.Scenario?

For **Company.Name** to align itself with the Select.Scenario by End.Year based on the company's current capacity, the following capacity adjustments by technology are required.

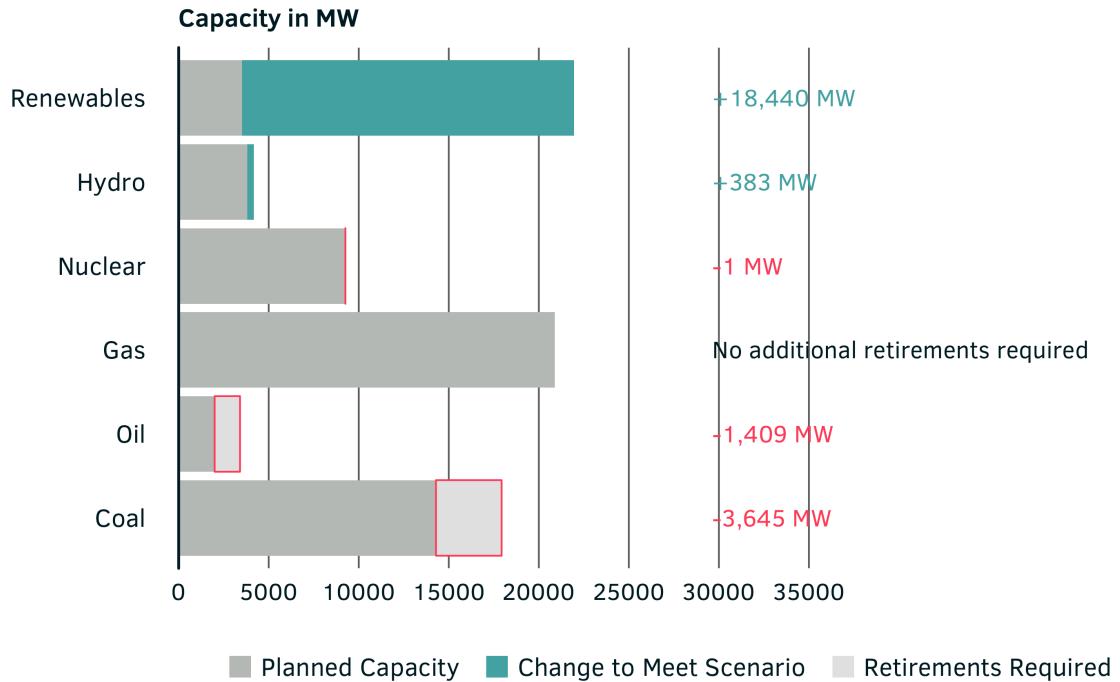


Figure 5: Changes in capacity required to align with the Select.Scenario.

By End.Year, Company.Name requires additional investment in renewables, hydro and nuclear technology to be aligned with the Select.Scenario. Retirements of oil and coal capacity are required.

In some cases, the company's investment plans may outperform the capacity required to align with the Select.Scenario. If the company's investment plan for low carbon technologies exceeds scenario targets, no retirements are specified. Similarly, no additions are specified if the company's plans already meet the transition pathways for high carbon technologies.

Comparison Between Utilities

How does the current capacity and future planned capacity of Company.Name for low carbon technologies compare to other utilities in the US market?

In this section, we represent the current energy mix of Company.Name relative to the other utilities in the US market, as well as its investment plans. Figure 6 highlights:

- On the x-axis, the percentage of low carbon technologies within the energy mix in Start.Year.
- On the y-axis, the percentage of new low carbon capacity additions of all planned additions by End.Year.
- The Start.Year total power capacity of each company via the size of the circles.

Company.Name is highlighted in black.

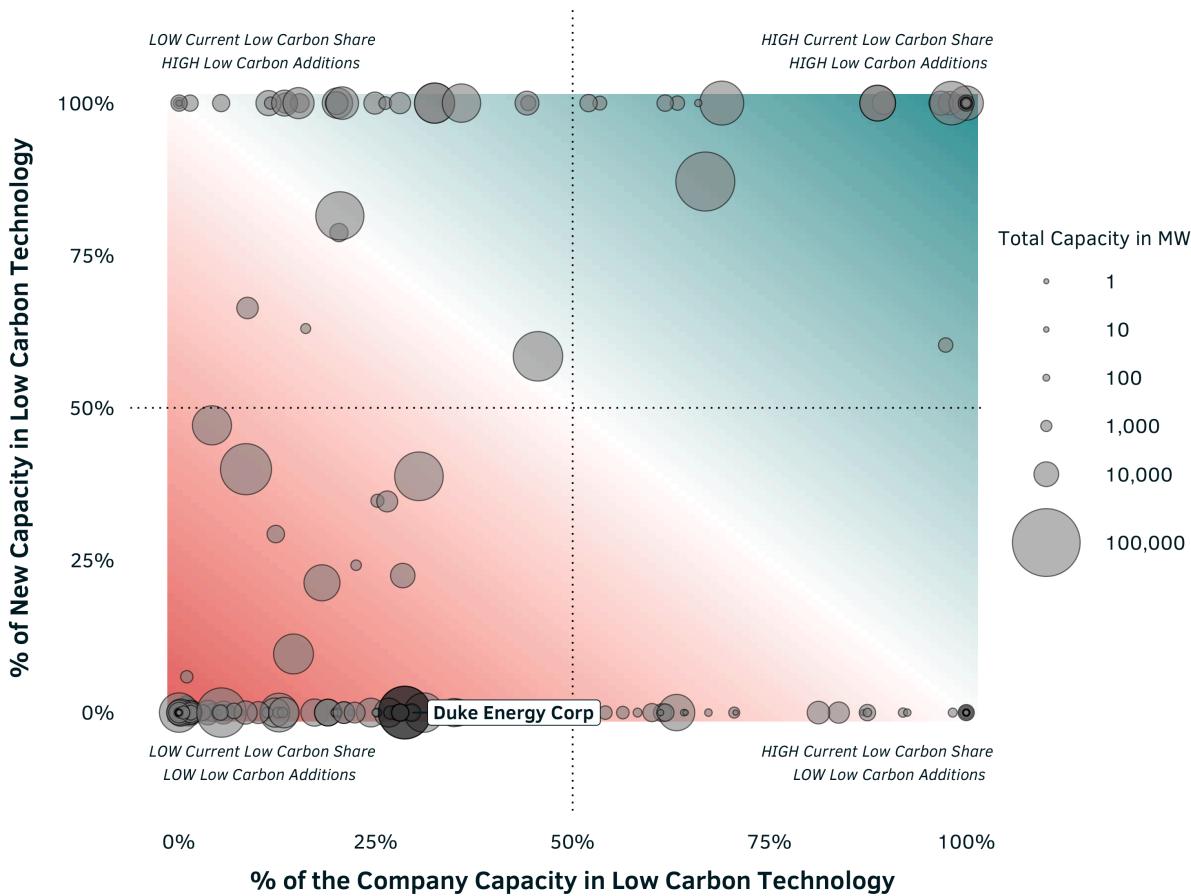


Figure 6: % planned capacity in low carbon technologies vs % current capacity in low carbon technologies.

Companies fall into one of four categories:

1. Upper Right: These companies are currently heavily invested in low carbon technologies as a share of the energy mix, and have plans to expand investment in these technologies even further.
2. Lower Right: These companies are currently heavily invested low carbon technologies as a share of the energy mix. However their planned capacity is either primarily high carbon, or they have no planned capacity additions.
3. Upper Left: These companies are not currently heavily invested in low carbon technologies, as a share of the energy mix however their planned capacity additions are primarily low carbon.
4. Lower Left: These companies are neither currently heavily invested in low carbon technologies as a share of the energy mix, nor have plans to build these out in the future.

Comparison Between Utilities

How do the investment plans in new capacity of Duke Energy Corporation compare to other utilities?

This section displays the investment plans by technology of all companies in the US market. It highlights the distribution of the global capacity build out of these companies, in renewable and coal capacity.

Between now and End.Year, 58% of companies in the US market have plans to invest solely in renewables while 2% of companies have plans to invest solely in new coal capacity. 44% of new capacity is in renewables whereas only 1.4% is in coal capacity.

The chart shows the build out volume of renewables and coal capacity for each company.

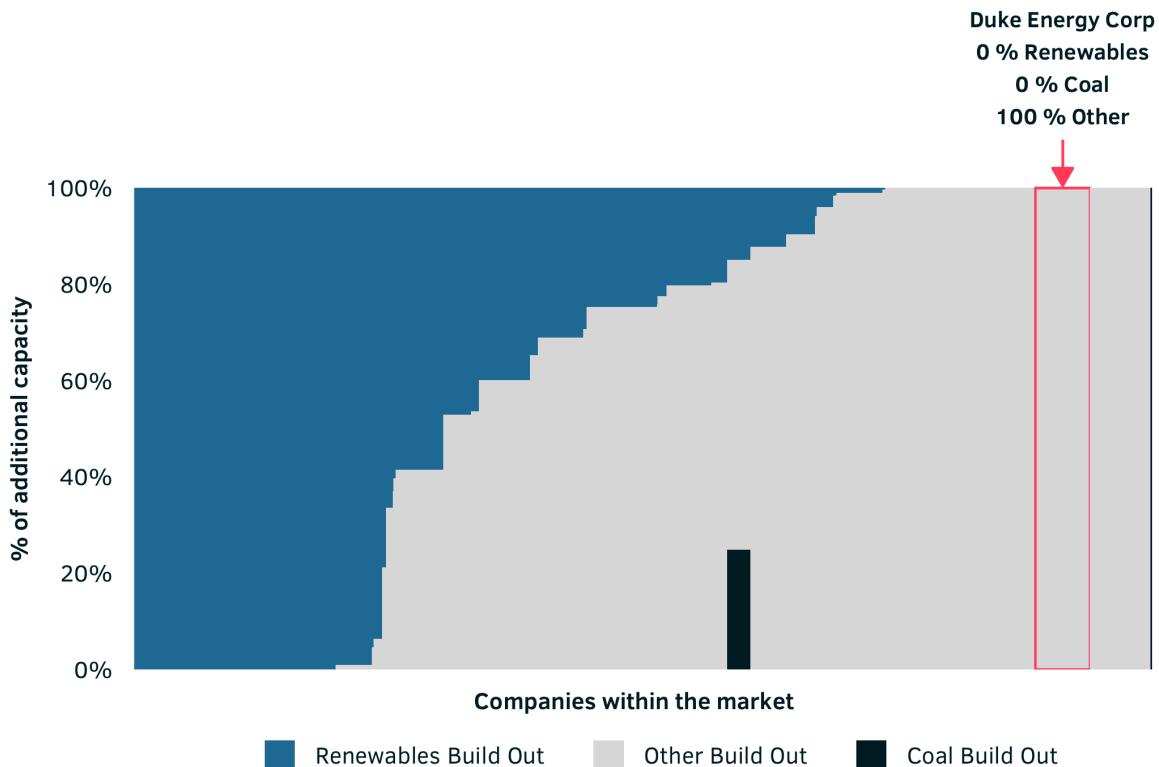


Figure 7: Breakdown of new power capacity by technology with a focus on Renewable and Coal power. The width of each bar represents the capacity of the build out of each company within the market.

Market Share

How does Company.Name's market share of each power technology evolve between Start.Year and End.Year?

Given the aforementioned plans of Company.Name over the next 5 years, one can also look at how its market share in key technologies is expected to develop and see how the company will be positioning itself in the future.

Figure 8 shows changes in the company's renewable and total power capacity market share, defined as the % of total capacity in each technology over the entire US power capacity in each technology.

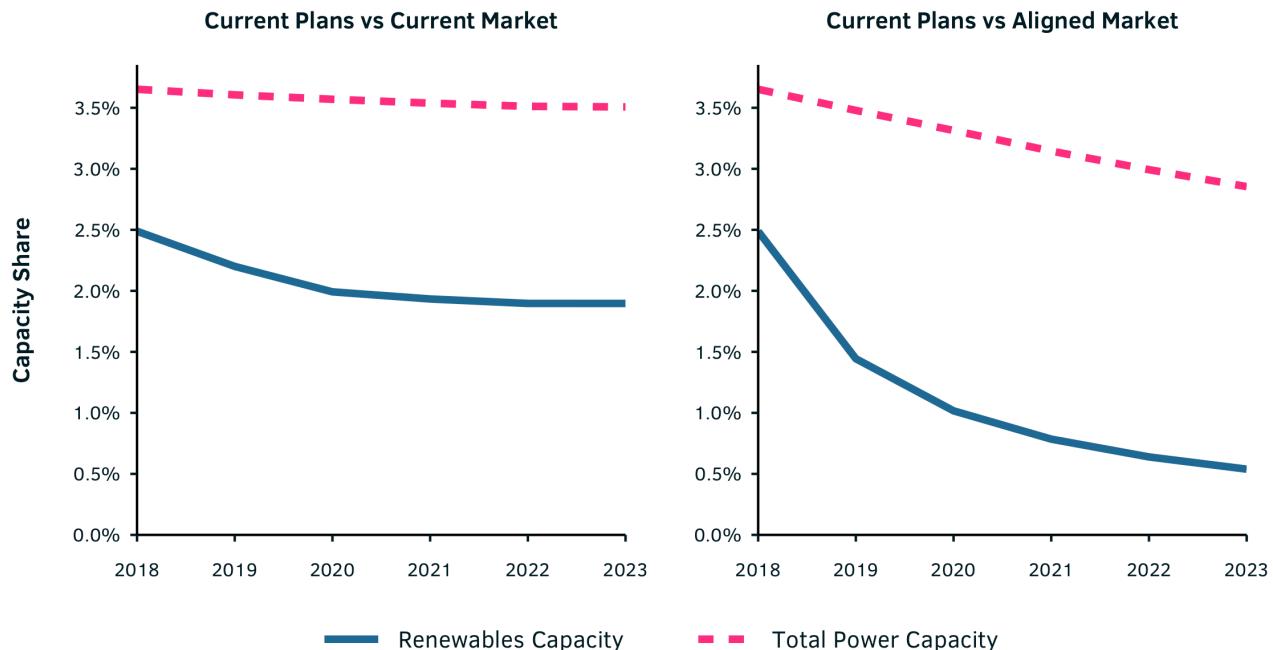


Figure 8: The above charts show how Company.Name's market share of the US market develops for renewable and total power capacity. The chart on the left provides a comparison to the US utility market given current plans, and the chart on the right, shows how this would develop, if the market were aligned with the Select.Scenario.

The market share of Company.Name is set to decrease given the actual plans of the market and the market under the Select.Scenario.

The market share for each technology represents the company's capital expenditure plan as a percentage of the capital expenditure plans of all utilities in the market (actual and aligned). If the company's renewables market share is decreasing over the next 5 years, this suggests that Company.Name plans to build out renewables capacity at a lower rate than the utilities market as a whole.

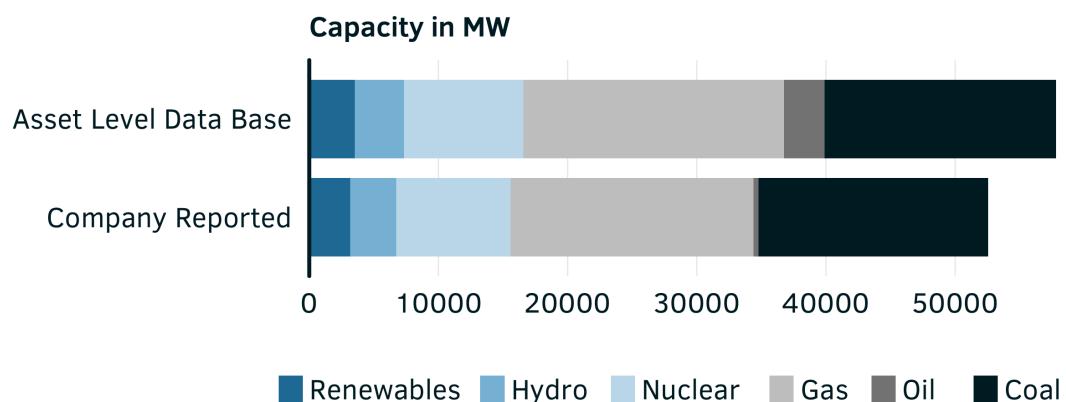
Data Validation

Data sources and validation

Power sector data is drawn from two sources: GlobalData and Bloomberg. The market intelligence database GlobalData provides asset-level data comprising highly granular information on individual power plants, including plant ownership, generation technology as well as active and pipeline capacity values. In order to establish links between assets and their ultimate owners, GlobalData's asset-level ownership information is supplemented with Bloomberg data on parent-subsidiary relationships. Installed capacity is attributed to companies based on equity ownership stakes they and their subsidiaries hold in individual power plants. It does not include electricity sourced under power purchasing agreements.

In order to validate the data underlying this report, self-reported capacity data was taken from the companies' website and annual report and compared to capacity data aggregated from GlobalData and Bloomberg. The comparison revealed a absolute discrepancy of 7% (see figure 9). Reasons for this discrepancy may include incorrect or missing subsidiary links, incorrect or missing stakes in power plants, inconsistent effective dates, differences in defining owned capacity, among others. Where possible, incorrect ownership information was updated based on a combination of company-reported and third-party information.

In addition, between March and June 2019, 2°ii reached out to all companies reported to seek edits or clarifications to the underlying data. Please review the legal disclaimer for further information about the limitations of the underlying data.



Data Type	Units	Renewables	Hydro	Nuclear	Gas	Oil	Coal
Asset Level Data Base	MW	3,516	3,803	9,259	20,190	3,127	17,934
Asset Level Data Base	%	6.1%	6.6%	16.0%	34.9%	5.4%	31.0%
Company Reported	MW	3,174	3,557	8,854	18,813	371	17,788
Company Reported	%	6.0%	6.8%	16.8%	35.8%	0.7%	33.8%

Effective date of company-reported data: 31/12/2017

Figure 9: Comparison between the power capacity provided in the company reports published by the company to the aggregation of data completed by 2°ii.

Legal Disclaimer

This Report has been prepared by the 2° Investing Initiative (2Dii) a leading not-for-profit think-tank on climate-related metrics and policies in financial markets. The Report summarises our Company Climate Scenario Analysis (CCSA) in relation to **Company.Name**. The CCSA is our limited 'point in time' estimate of the alignment between **Company.Name**'s revealed business plans in the period Start.Year-End.Year, versus the economic trends embodied in the International Energy Agency's (IEA's) 'Energy Technology Perspective' scenarios (all else being equal). The methodology applied in the CCSA, its data inputs, general assumptions and limitations, are set out in a Methodology statement on page 8 of this Report.

Limitations and assumptions: The CCSA does not purport to analyse all issues associated with climate change that may be relevant to **Company.Name**. Such issues may include (for example) physical or ecological impacts that may be caused by, or to, the operations of the company, and any climate-related litigation exposures.

The CCSA utilises publicly-available information, and proprietary third party data obtained under licence, which 2Dii believes in good faith to be reliable. However, 2Dii makes no representation or warranty (express or implied) as to the completeness, accuracy or currency of such information, nor the currency of the information in this Report. We commit to re-run the CCSA based on data provided by **Company.Name** if requested.

No forecast or prediction: The CCSA does not purport to generate, nor does this Report contain or comprise, forecasts or predictions. 2Dii neither makes nor implies any representation regarding the likelihood, risk or expectation of any future matter. To the extent that any statements made or information contained in this Report might be considered forward-looking in nature, they are subject to risks, variables and uncertainties that could cause actual results to differ materially. You are cautioned not to place undue reliance on any such forward-looking statements, which reflect our assumptions only as of the date of modelling.

No financial advice: The information contained in this Report is general in nature. It does not comprise, constitute or provide personal, specific or individual recommendations or advice, of any kind.

In particular, it does not comprise, constitute or provide, nor should it be relied upon as, investment or financial advice, a credit rating, an advertisement, an invitation, a confirmation, an offer, a solicitation, an inducement or a recommendation, to buy or sell any security or other financial, credit or lending product or to engage in any investment activity, nor an offer of any financial service.

This Report does not purport to quantify, and 2Dii makes no representation in relation to, the performance, strategy, prospects, creditworthiness or risk associated with Company.Name or any investment therein, nor the achievability of any stated climate targets (of Company.Name, the IEA or otherwise).

The Report is made available with the understanding and expectation that each user will, with due care and diligence, conduct its own investigations and evaluations, and seek its own professional advice, in considering Company.Name's financial performance, strategies, prospects or risks, and/or the suitability of any investment therein for purchase, holding or sale within their portfolio.

IEA Scenario(s): The choice of any scenario should not be taken as any endorsement of it, nor any statement as to the accuracy or completeness of its methodologies or assumptions, nor as a general preference for it over any other economic scenario(s). The CCSA may be carried out using other economic scenarios, and users must form their own view as to the decarbonisation or economic scenarios, trajectories and models that are most appropriate to their circumstances. No explicit or implicit assumption is made in relation to the current or future alignment of the scenarios with climate-related policies of any government at international, national or sub-national level.

TCFD: The CCSA may support you in initiatives undertaken with regard to the Recommendations of G20 Financial Stability Board's Taskforce on Climate-Related Financial Disclosures (TCFD). However, its use in isolation does not purport to provide 'TCFD compliance'.

Exclusion of liability: to the extent permitted by law we will not be liable to any user for any direct, indirect or consequential loss or damage, whether in contract, tort (including negligence), breach of statutory duty or otherwise, even if foreseeable, arising under or in connection with use of or reliance on any information, data or content obtained via our services, including (without limitation) the information or opinions stated in this report.