



Climate Scenario Analysis

Company.Name

Report Start.Year

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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.

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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'.

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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 utilities in the Bench.Region market.

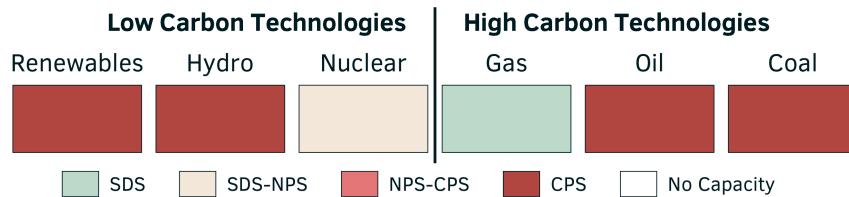
Installed Capacity Start.Year

Company.Name has CapInstalledStart MW of installed capacity with CompPercLowCStart% coming from low carbon technologies. By End.Year, PlannedAdditions

	Renewables	Hydro	Nuclear	Gas	Oil	Coal
Existing Production (MW)	3,516	3,803	9,259	20,190	3,398	17,934
Net Additions (MW) 2018-2023	0	0	0	698	280	0

Comparison of investment plans with transition scenarios

Company.Name's planned capacity additions are compared to the different climate scenarios of the International Energy Agency (IEA) for each technology as described on page 4. The additional capacity planned by **Company.Name** ScenarioStatement



Changes in Capacity required to align with the Select.Scenario by End.Year

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

	Renewables	Hydro	Nuclear	Gas	Oil	Coal
Existing Production (MW)	3,516	3,803	9,259	20,888	3,678	17,934
Net Additions (MW) 2018-2023	24,538	486	1	2,209	-1,433	-3,642

Introduction

Key Questions

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

1. How does the company's current energy mix compare to the power market's energy mix? (Page 6)
2. How do the company's investment plans compare to different climate transition scenarios? (Page 7)
3. How does the company's planned energy mix by End.Year compare to the scenario-aligned market? (Page 9)
4. How can the company adjust its investment plans to align with the Select.Scenario by End.Year? (Page 10)
5. How does the company's climate alignment compare to other utilities? (Page 11)

This document solely presents the results of the above analyses. 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 an assessment of the physical assets owned by **Company.Name** and its investment plans in new capacity, based on third party data. The share of responsibility, defined by climate scenarios that outline possible transition pathways, has been allocated to the company according to the regional distribution of its power capacity. Further analyses allow us to understand how **Company.Name** is currently, and in the future, exposed to climate transition risks and opportunities.

How can it be used?

For **Companies**, this analysis provides a comparison of its performance relative to peers, and an understanding of how climate change responses differ. It also provides an overview of how planned capacity changes compare to the climate scenarios developed by the International Energy Agency (IEA). It highlights potential areas for action by 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 potential exposure to transition risks. 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 is based on third party data from GlobalData (effective as of 06/2018) and may vary from what is announced by the company in annual reports; the data in this report reflects an aggregation of the known subsidiaries of **Company.Name** aggregated under the equity share principle. Details regarding the data sources and processing can be found on page 14. Companies are invited to review the data and provide feedback to assist in improving the underlying data sets by emailing 2dii at transitionmonitor@2degrees-investing.org.

Reading the Report

Report Contents

This report consists of three 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 peer companies operating in the same market.

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 as high carbon technologies. Renewable technologies include solar, wind and biomass. While acknowledging other sustainability issues linked to different technologies, the analysis in this report focuses on the low carbon versus high carbon split.

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 **Company.Name** has in each technology.

Market: The market referred to in this report is designated based on the country of domicile of **Company.Name**. The market therefore includes all Bench.Region utilities.

Aligned with a scenario: To be aligned with a scenario implies that the capacity build out of the company matches what is expected based on the roadmaps developed by the IEA.

Scenarios: Four IEA scenarios are included in this report’s analysis: three are sourced from the World Energy Outlook 2018 (WEO 2018) and one from the Energy Technology Perspectives 2017 (ETP 2017) and are detailed in Table 1. These have been chosen due to their regional and technological granularity. The Select.Scenario is used as the benchmark scenario. The scenarios consist of technology roadmaps 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 required.

Table 1: Overview of the IEA scenarios used in the analysis.

Scenario Full Name	Abbreviation	Estimated temperature increase by 2100*	Source
Beyond 2° Scenario	B2DS	1.75°C	ETP 2017
Sustainable Development Scenario	SDS	1.7-1.8°C	WEO 2018
New Policy Scenario	NPS	2.7°C	WEO 2018
Current Policy Scenario	CPS	3.3°C	WEO 2018

*The temperature rise estimates for the B2DS, SDS and NPS are specified by the IEA. The CPS estimate is taken from Climate Action Tracker’s 2018 Warming Projections Global Update.

Company Profile

This section outlines the current and future energy mix and capacity distribution of **Company.Name**. Figure 1.1 shows the changes in capacity in each technology between Start.Year and End.Year. From this, one may be able to extrapolate 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.

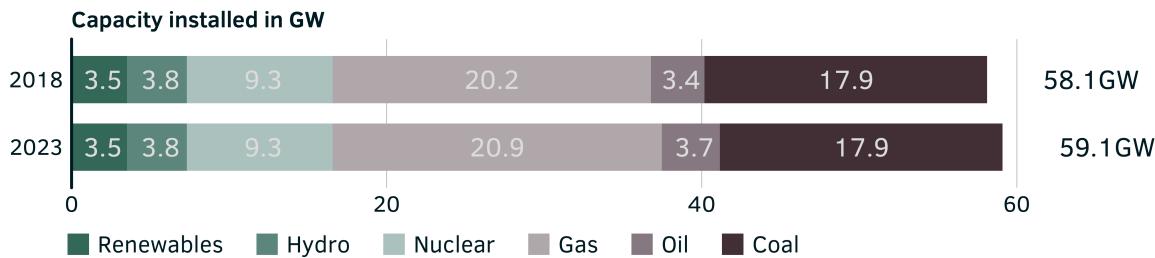


Figure 1.1: Company energy mix in Start.Year and End.Year.

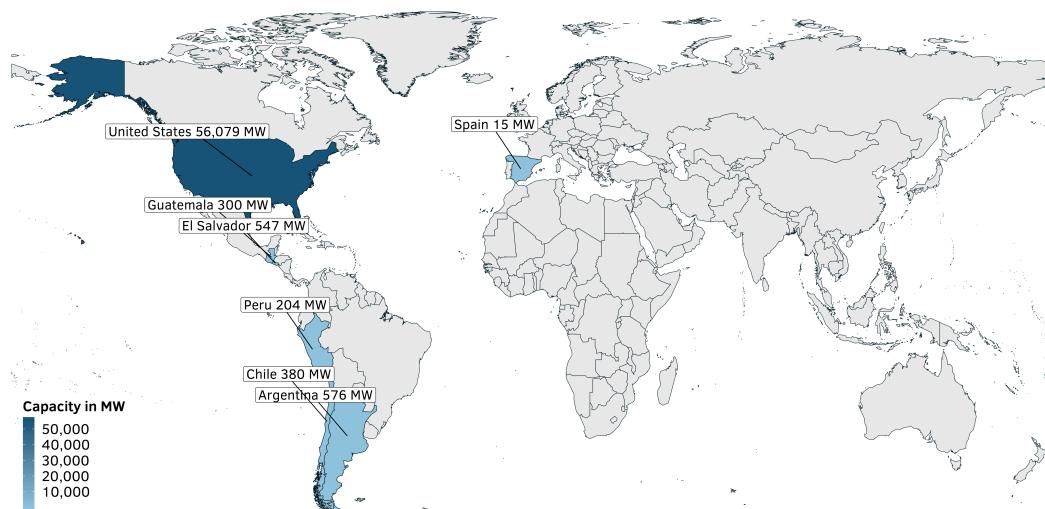


Figure 1.2: Geographical distribution of the company's power generating assets in Start.Year.

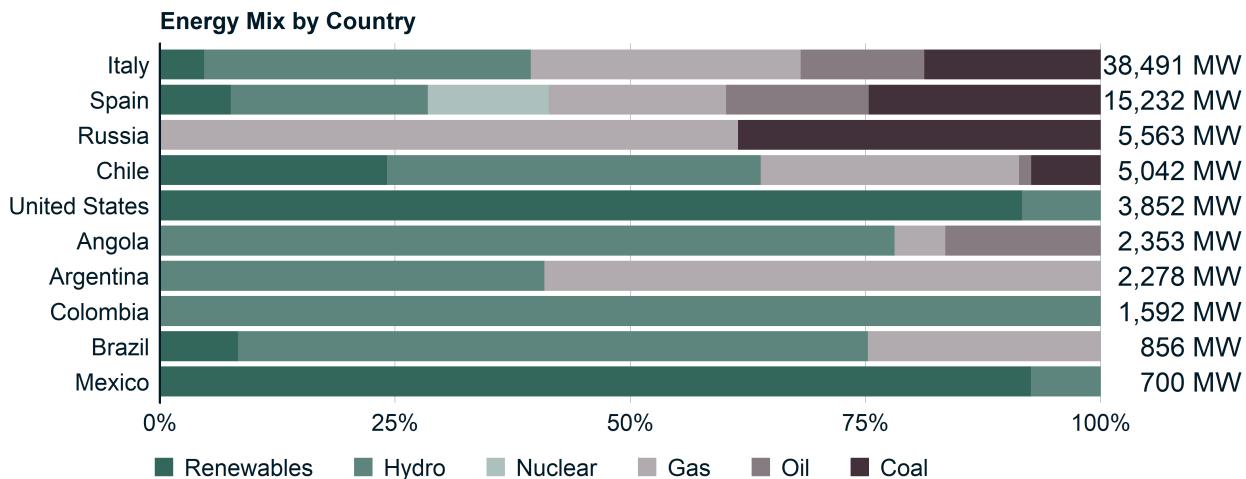


Figure 1.3: Overview of the company's energy mix and total capacity in the largest countries by total capacity in Start.Year.

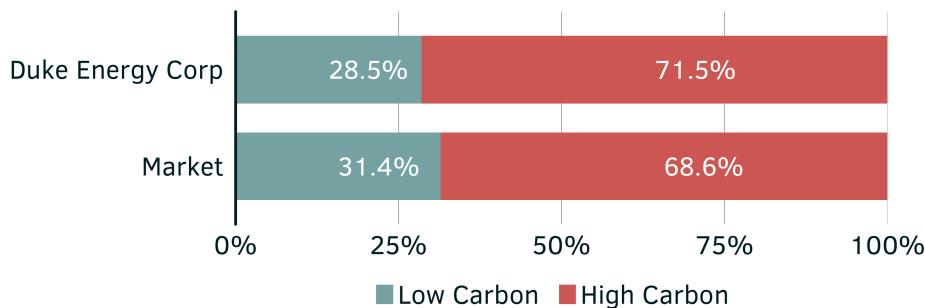
Current Alignment

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

This section provides an overview of the diversification of **Company.Name**'s 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, the company's energy mix is presented both in terms of the share of low carbon technologies of its total capacity, and the breakdown of its capacity by technology specifically. The market is representative of all utilities in the Bench.Region power market.

A) Low and high carbon energy mix percentage



B) Energy mix by technology percentage

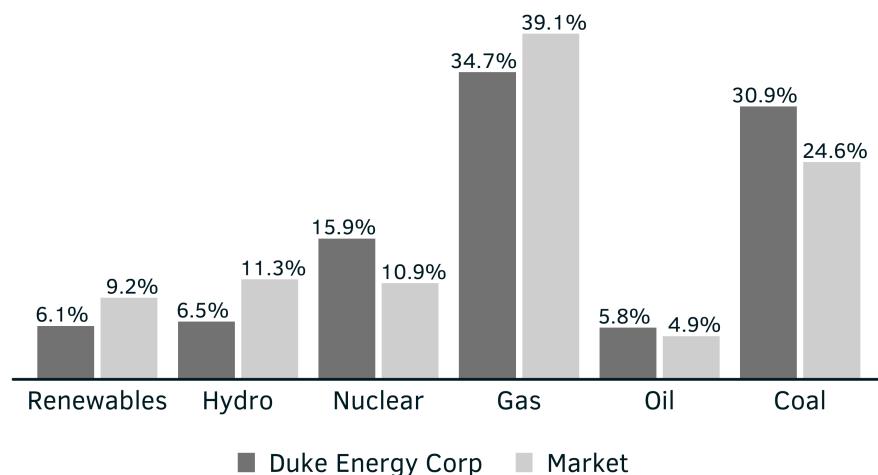


Figure 2.1: Comparison of the company's energy mix to the market's energy mix in Start.Year by A) low carbon vs high carbon split and B) by technology.

Company.Name has **CompPercLowCStart%** of its power capacity in low carbon technologies compared to **MarketPercLowCStart%** in the market. Company.Name TechShareComparisonStart

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**'s planned changes in capacity 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 capacity 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 Beyond 2 Degree Scenario (B2DS), the New Policy Scenario (NPS) and the Current Policy Scenario (CPS).

Alignment with climate scenarios may vary by technology. For each technology, figure 3.1 summarises the different IEA scenarios that **Company.Name**'s investment plan aligns with. 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.

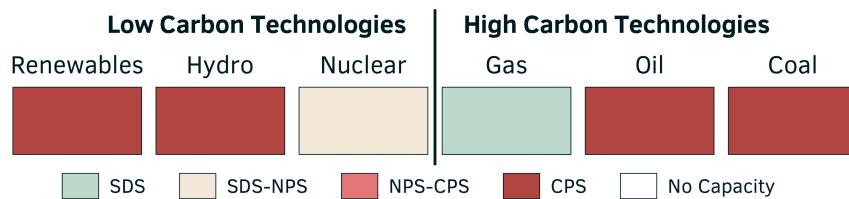
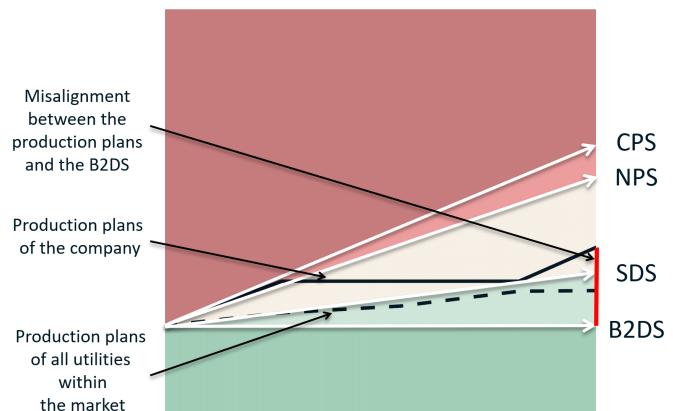


Figure 3.1: Scenario outcome of the build out plans for each technology by End.Year. This summarises the results of the trajectory charts in End.Year.

The additional capacity planned by Company.Name ScenarioStatement

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.

The background colours represent how the trajectory of a technology should progress under the relevant scenario based on the geographical exposure of the company's power capacity. The solid and dashed lines represent the production plans of the company and those of the utility market scaled to the starting point of the company. In the chart to the right, the company's investment plans for this technology lie between the SDS and NPS trajectories. The difference in End.Year between the company's production plan and the end point for a specific scenario indicates the change in capacity that would be required for alignment. The market capacity can be compared to the company plans as a relative indicator only, as the scenarios are specific to the company. In this case, the company is building out more of this technology than the market.



Trajectory

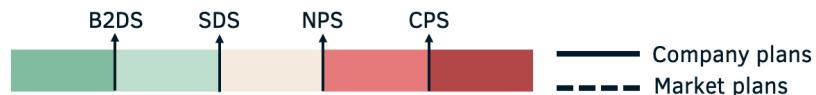
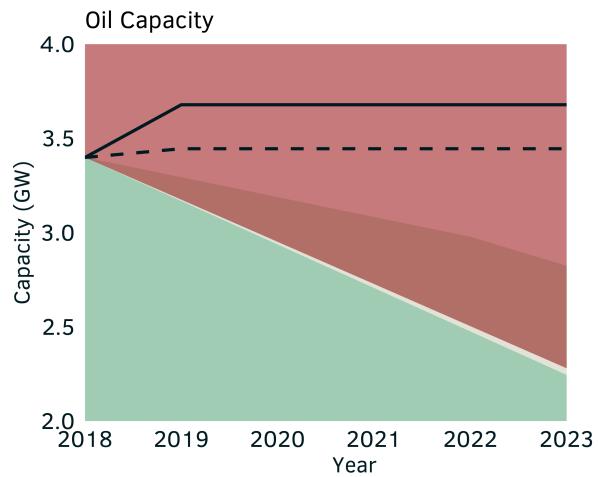
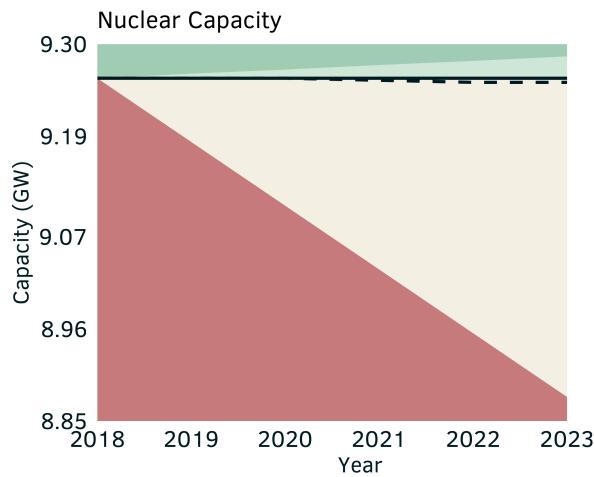
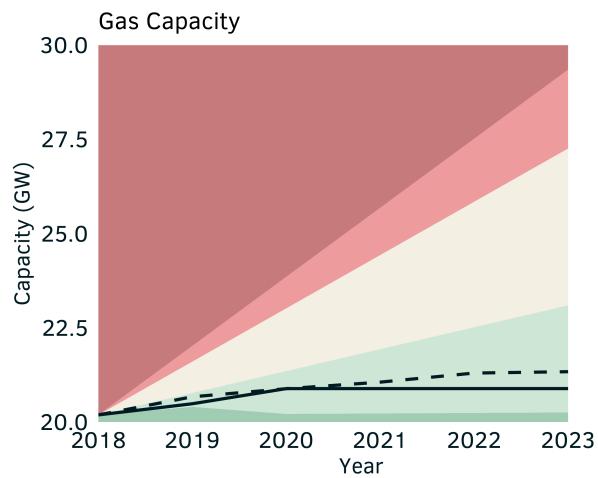
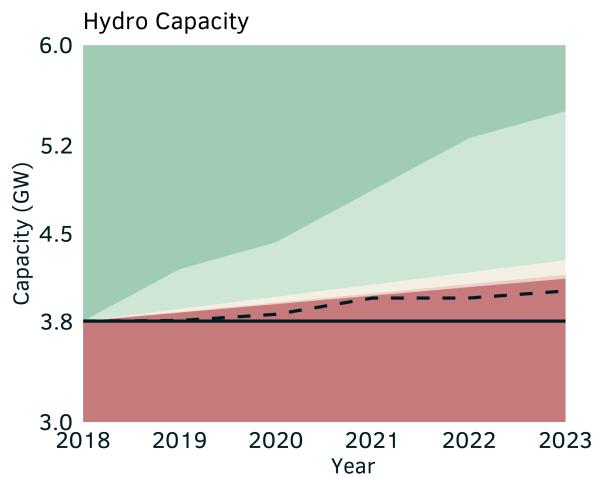
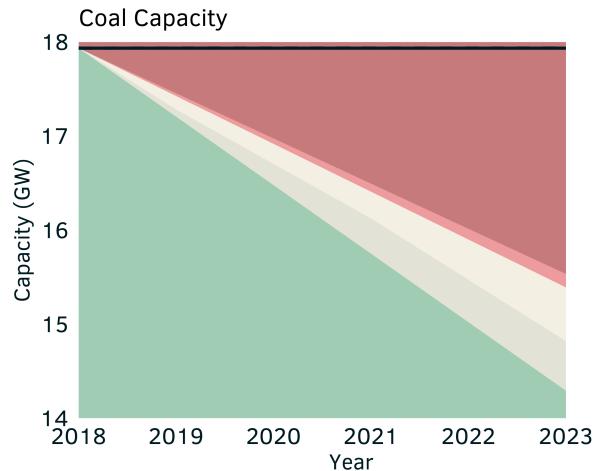
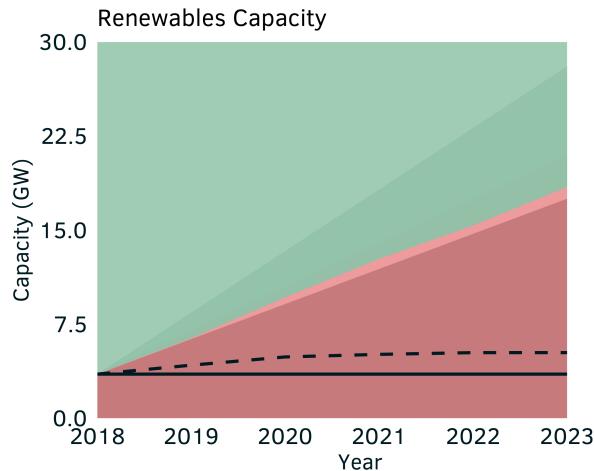


Figure 3.2: illustrates how **Company.Name**'s planned capacity changes in each technology compare to different IEA transition pathways and the market.

Future Alignment

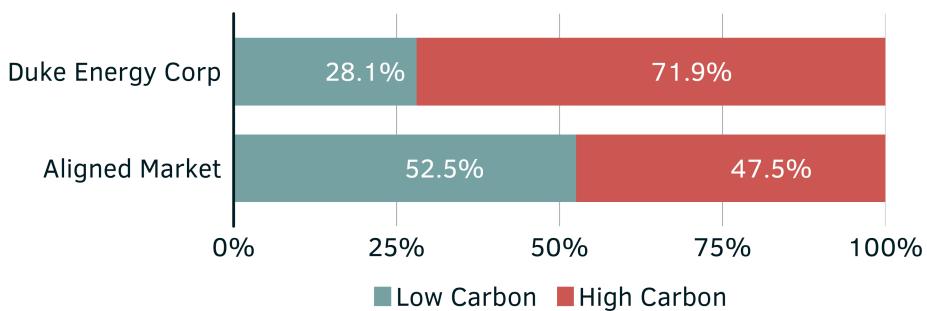
How will the planned energy mix of Company.Name compare to a Bench.Region utility market aligned with the Select.Scenario in End.Year?

The energy mix of **Company.Name** in End.Year is based on its energy mix in Start.Year plus planned capacity changes between Start.Year and End.Year. The aligned market energy mix shows what would be expected if the current Bench.Region power market were to develop over the next five years in accordance with the Select.Scenario.

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

Figure 4 shows that **Company.Name** has an energy mix in End.Year which has FutureLowHigh% percentage points or RelativeHighLow% LessOrMore low carbon capacity than an aligned market.

A) Low and high carbon energy mix percentage



B) Energy mix by technology percentage

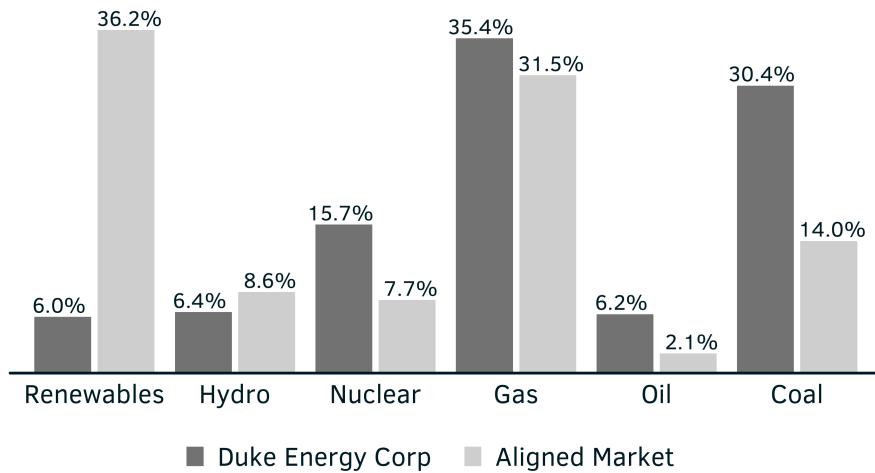


Figure 4.1: Comparison of the company energy mix to the market energy mix in End.Year.

By End.Year Company.Name TechShareComparisonEnd

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 changes by technology are required.

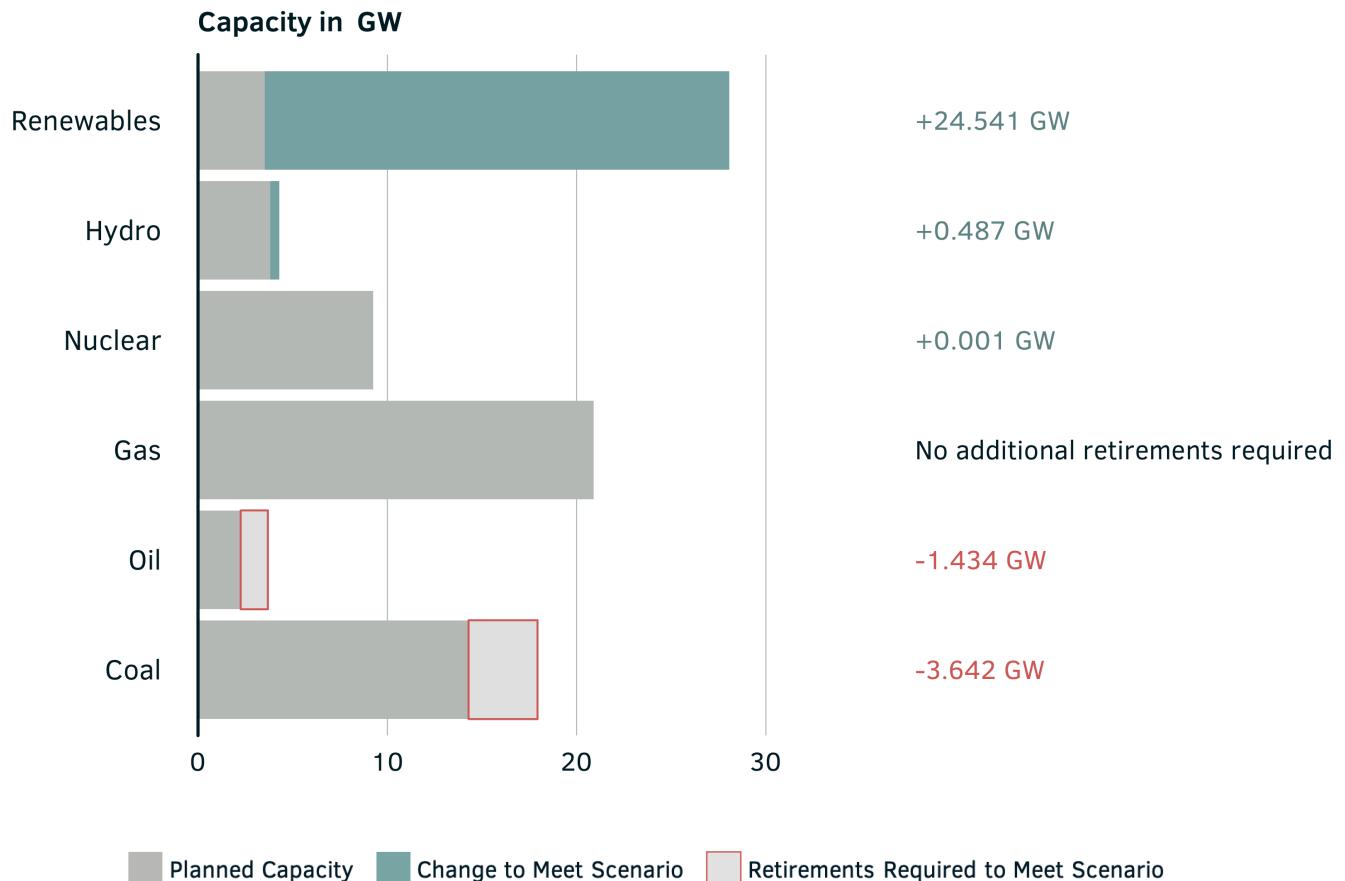


Figure 5: Changes in capacity required to align with the Select.Scenario.

By End.Year, Company.Name AchievingAlignment

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 Bench.Region market?

In this section, we represent the current energy mix of Company.Name relative to the other utilities in the Bench.Region 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 planned additions by End.Year which are low carbon.
- The Start.Year total power capacity of each company via the size of the circles. Each circle represents a separate utility.

Company.Name is highlighted in black.

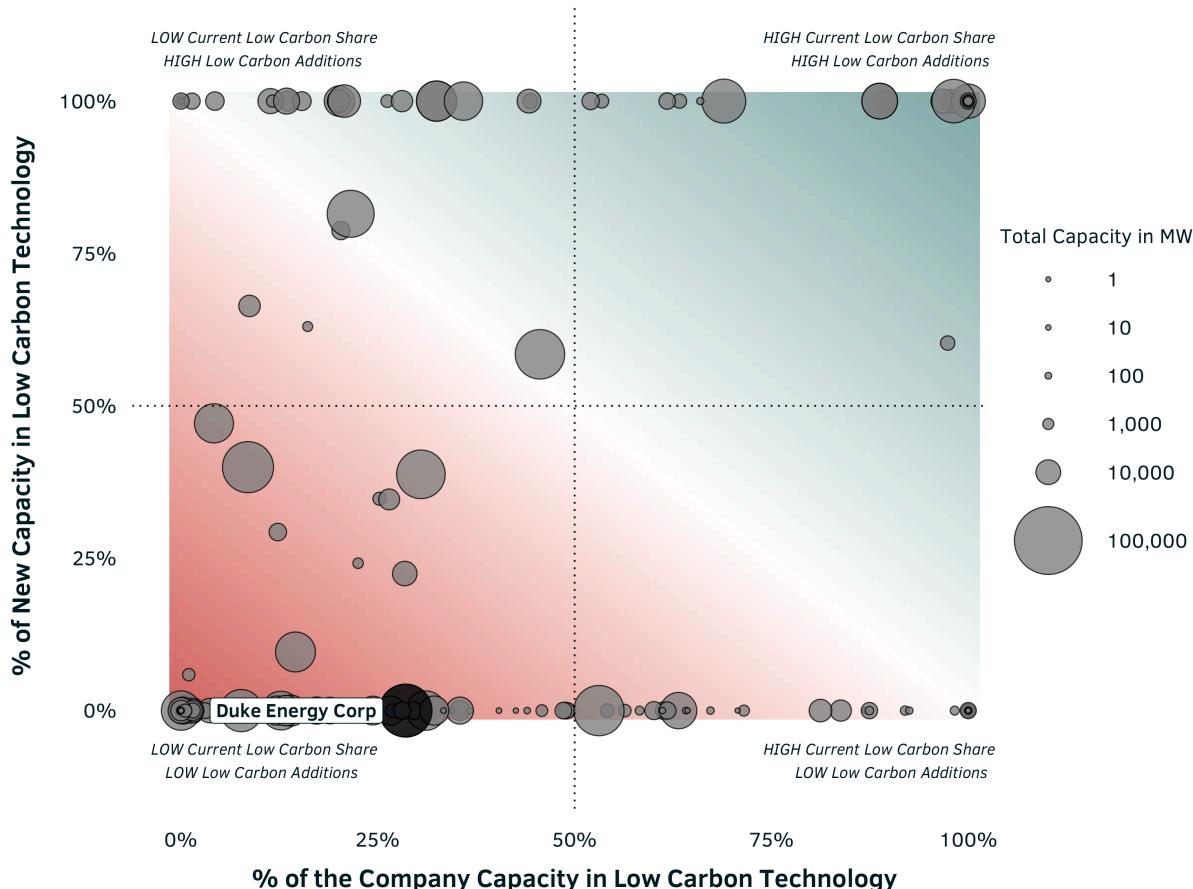


Figure 6: % planned future capacity in low carbon technologies vs % current capacity in low carbon technologies.

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 in 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 Company.Name compare to other utilities?

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

Figure 7 shows the planned capacity changes between Start.Year and End.Year. The width of each bar represents the capacity of the build out of each company in the market: i.e. a company with 5 times as much capacity build out will be 5 times as wide as another company.

CompRenewBuildout% of companies in the Bench.Region market have plans to invest in renewables (NewCapRenew% of new capacity) while CompCoalBuildout% of companies have plans to invest in new coal capacity (NewCapCoal% of new capacity).

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

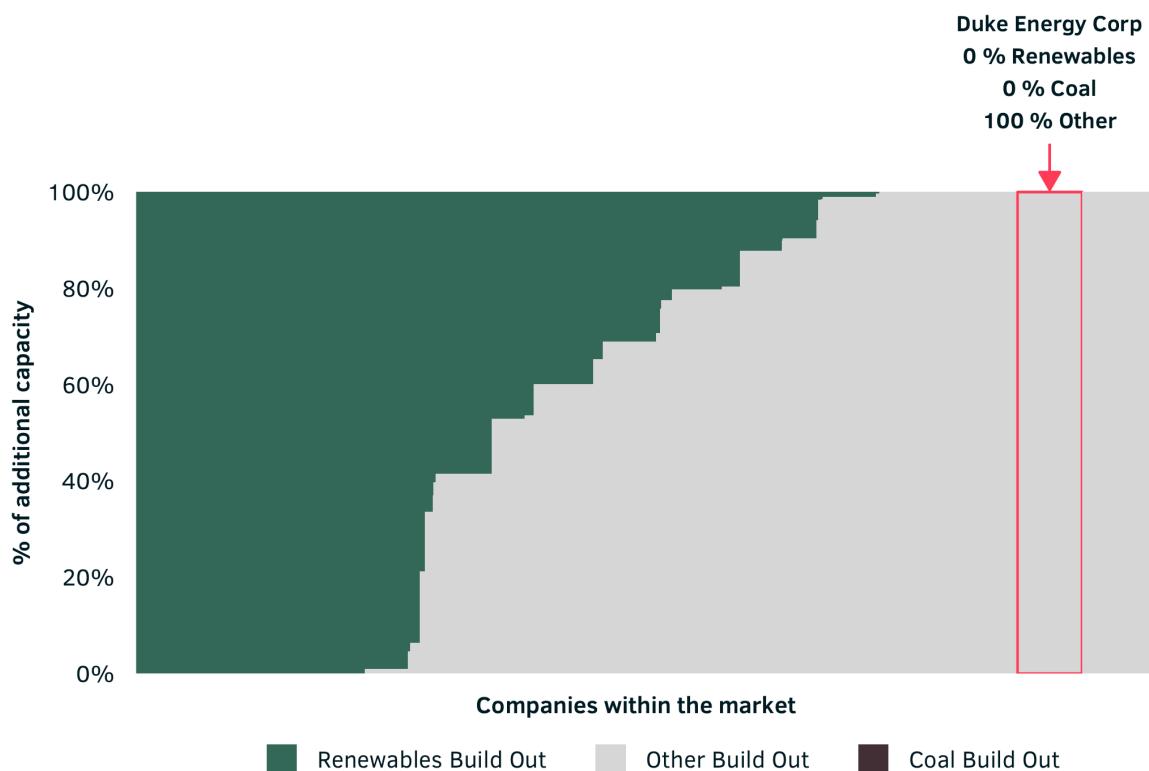


Figure 7: Breakdown of new power capacity by technology with a focus on Renewable and Coal power. The width of each bar represents the capacity of the build out of each company within the market.

Market Share

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

This section shows how Company.Name's market share in key technologies is expected to develop between 2018 and 2023 and what the company's future positioning relative to the market will be.

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 Bench.Region power capacity in each technology.

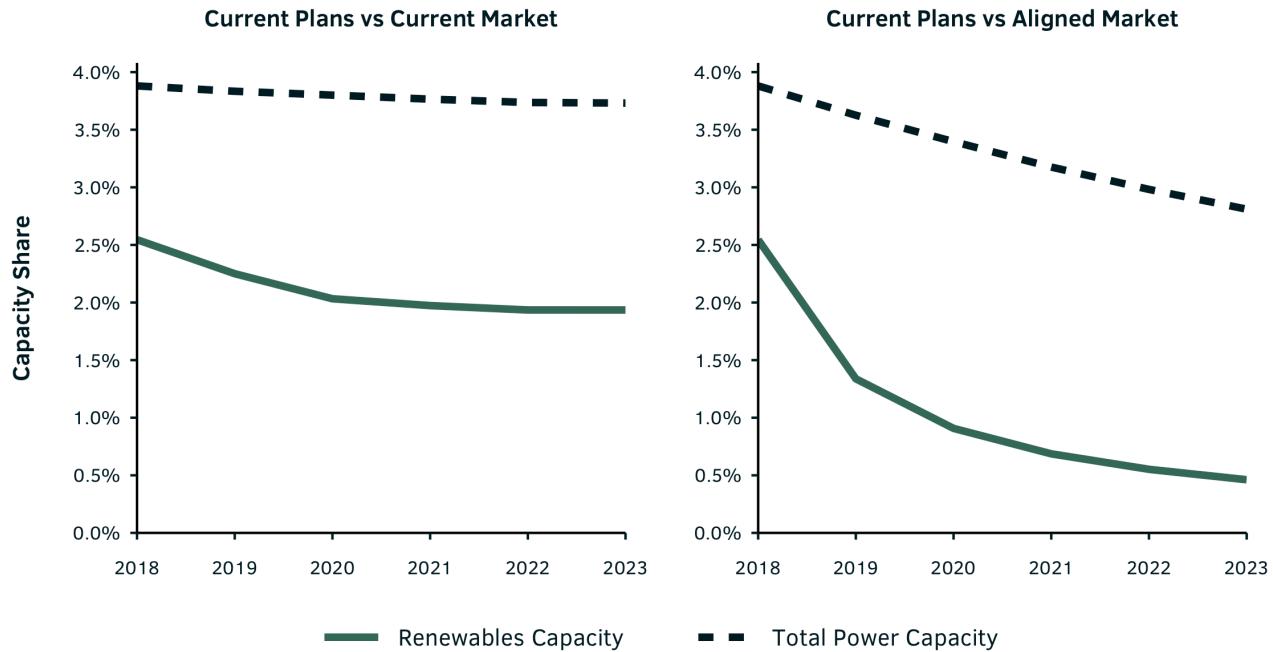


Figure 8: The above charts show how Company.Name's market share of the Bench.Region market develops for renewable and total power capacity. The chart on the left provides a comparison to the Bench.Region utility market given current plans, and the chart on the right shows how this would develop if the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

The total market share of Company.Name ChangeMS Its market share of renewable capacity RenewablesM-SChange

The market share for each technology represents the company's capacity as a percentage of the capacity of all utilities in the market (actual and aligned) including current accounted plans. 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.

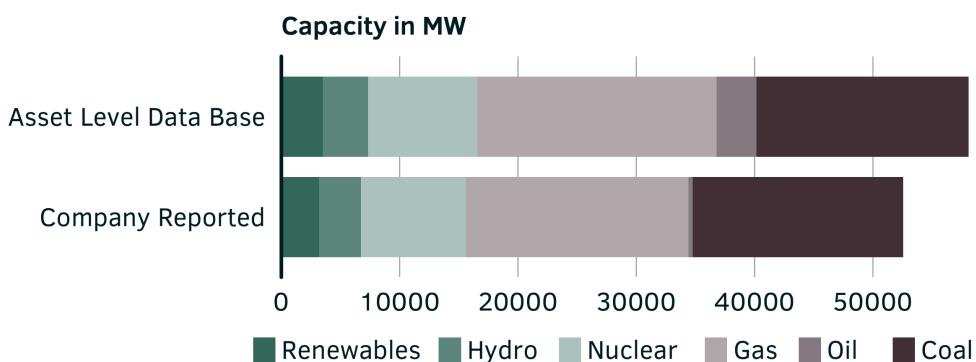
Data Sources

2dii scenario analysis is based on forward-looking power asset data from GlobalData paired with company ownership information from Bloomberg. GlobalData provides highly granular information on individual power plants, including plant ownership, technology employed, location as well as active and pipeline capacity values. The company's current energy mix was calculated by aggregating capacities across active plants where the company is listed as owner, weighted by an ownership stake. 5-year investment plans were calculated by aggregating capacities from plants with years online between 2019 and 2023. Power capacity was allocated from subsidiary companies to the company based on company ownership data sourced primarily from Bloomberg. The result is a forward-looking energy mix for **Company.Name** that serves as starting point and basis for comparison for scenario analysis. It does not include electricity sourced under power purchasing agreements.

Self-reported energy mix data was taken from the company's website or annual report and compared to the energy mix used in this report. The comparison revealed a discrepancy of Company.Discrepancy% (see figure 9). Reasons for discrepancy fall into three categories:

1. We take asset data and ownership information from two major data providers: GlobalData and Bloomberg. The data we receive from these sources may in some cases be incomplete or contain errors. Errors may include missing assets, missing or inaccurate parent-subsidiary information, and missing or inaccurate asset ownership data.
2. We allocate capacity from subsidiaries to parent companies according to the following rules: If a subsidiary company is private/unlisted, 100% of its capacity is allocated to the parent company holding the controlling stake. If a subsidiary is public/listed, the non-free float portion of its capacity is allocated to the parent company holding the controlling stake. No power capacity is allocated to parent companies holding non-controlling stakes.
3. Data sourced from GlobalData is effective as of 06/2018, and data from Bloomberg is effective as of 12/2018. This may differ from the effective dates of company reported data.

The energy mix data is still undergoing quality review. As part of the quality review process, 2dii reached out to all companies included in the reports to seek edits and clarifications to the underlying data. Please review the legal disclaimer for further information about the limitations of the data.



Data Type	Units	Renewables	Hydro	Nuclear	Gas	Oil	Coal
Asset Level Data Base	MW	3,516	3,803	9,259	20,190	3,398	17,934
	%	6.1	6.5	15.9	34.7	5.8	30.9
Company Reported	MW	3,174	3,557	8,854	18,813	371	17,788
	%	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 2dii.

Company Statement

CompanyText