TRANSITION PATHWAY INITIATIVE

TPI State of Transition Report 2018

Management Quality and Carbon Performance of coal mining, electricity utilities and oil & gas

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RESEARCH FUNDING PARTNERS:

We would like to thank our Research Funding Partners, Aberdeen Standard Investments, BNP Paribas Asset Management and Legal & General Investment Management, for their ongoing support to the Transition Pathway Initiative and their enabling the research behind this report and its publication.

Foreword

By Adam Matthews and Faith Ward, co-chairs of the TPI

TPI – The Asset Owner Carbon Performance Assessment Tool

The Transition Pathway Initiative was established to **empower and enable asset owners to add their voice** to debates on climate change and the financing of the transition to a low-carbon economy.

Although the toolkit was **designed by asset owners** for asset owners, since TPI's launch in early 2017, the tool has also been used by asset managers, sell-side analysts, investment banks, and research and proxy service providers – demonstrating its versatility and effectiveness. TPI is now supported by asset owners and asset managers representing **£7/$9.3 trillion** in assets under management.

We believe the strength of the tool comes from **its clarity and academic rigour** – making it decision-useful! **The clarity** provides time poor, overloaded asset owners with standard, comparable metrics across the 183 companies and seven sectors covered by TPI. **The academic rigour** is driven by the world-leading Grantham Research Institute at the London School of Economics and Political Science, and the practical data solutions provided by FTSE Russell; together they provide the information asset owners need in a useable and impactful way.

This report introduces three new indicators that brings the TPI methodology into alignment with the recommendations from the **Taskforce on Climate-related Financial Disclosures (TCFD)**, providing the macro-framework based on company public disclosure which enables investors to assess which companies are taking action (management quality); and which are aligning their business model (carbon performance) to meet the ambitions of the **2015 Paris Agreement**.

The findings of this report show some very positive messages – for example over half of the company targets in the electricity generation sector are ambitious enough to **align with the Paris Pledges (NDCs) in 2020**, and most of them are even ambitious enough to **align with a Below 2 Degrees scenario.** There has also been demonstrable improvement in management quality by companies previously assessed by TPI over a year ago.

Alongside the publication of this report TPI is also outlining the feedback we have received to the Discussion Paper on Oil and Gas Carbon Performance. It is clear that TPI has outlined a methodology that enables asset owners to track **future carbon performance in this sector based on public disclosure.** This is a key development that has the potential to considerably shape our understanding of transition in this important sector and our engagement with it.

Both reports capture the significant progress that is being made by many companies in the most challenging sectors of our economy. They also demonstrate that there is much to be done by both companies and policy makers if our ambitions of ensuring that these major sectors of the economy align with, or exceed, the goals of the Paris Agreement.

We will continue to increase our coverage of those companies, public and private, that make the most significant contribution to global greenhouse gas emissions. **TPI will provide an accountability mechanism for these companies**, and for investors looking to assess the effectiveness of their engagement. We will continue to build our asset owner constituency and encourage them to increase the use of TPI across the investment industry.

Executive Summary

This new report by the Transition Pathway Initiative (TPI) assesses the carbon management and performance of 105 of the world's largest and highest-emitting public companies in three sectors at the heart of climate change: coal mining, electricity, and oil and gas. It updates assessments published by TPI in 2017, enabling us to track companies' progress. We extend coverage in the electricity sector from 20 to 41 companies and in the oil and gas sector from 20 to 45 companies. We also cover 19 of the world's largest publicly listed mining companies that were engaged in mining coal in 2017/18.

TPI's assessment is divided into two parts:

1. Management Quality covers companies' management/governance of greenhouse gas emissions and the risks and opportunities arising from the low-carbon transition.

2. Carbon Performance assessment involves quantitative benchmarking of companies' emissions pathways against the international targets and national pledges made as part of the 2015 UN Paris Agreement, for example limiting global warming to below 2°C.

We assess Management Quality and Carbon Performance separately, because a large body of research shows the relationship between them is by no means clear cut. Management Quality assessment focuses on processes, while Carbon Performance focuses on outcomes. Together they are intended to provide a holistic view of companies' progress on the low-carbon transition. The framework is aligned with recommendations of the FSB Taskforce on Climate-related Financial Disclosures (TCFD), tracking companies in relation to TCFD's four recommendation areas: governance, strategy, risk management, and metrics and targets.

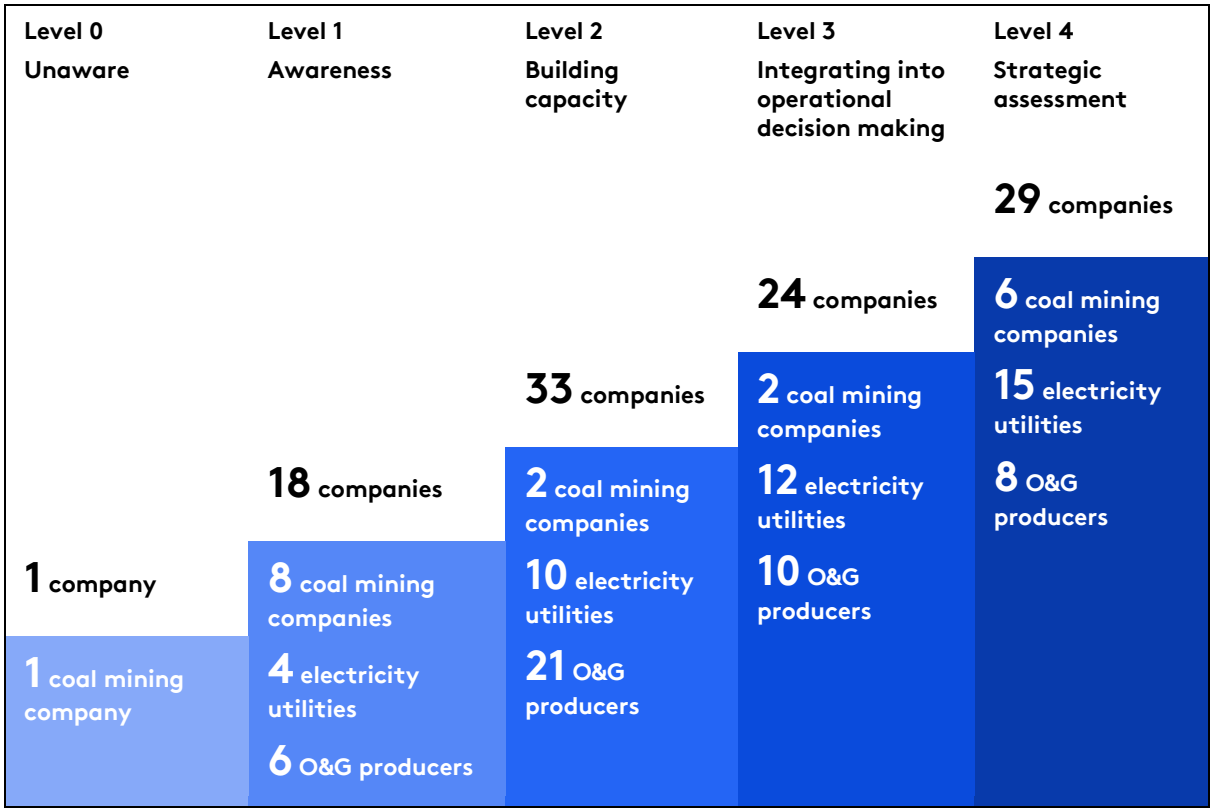
TPI publishes the results of its analysis through an open access online tool, available at http://www.transitionpathwayinitiative.org. The online tool now contains 183 company assessments across seven sectors. The other four sectors assessed to date are automobile manufacturing, cement, paper and steel.

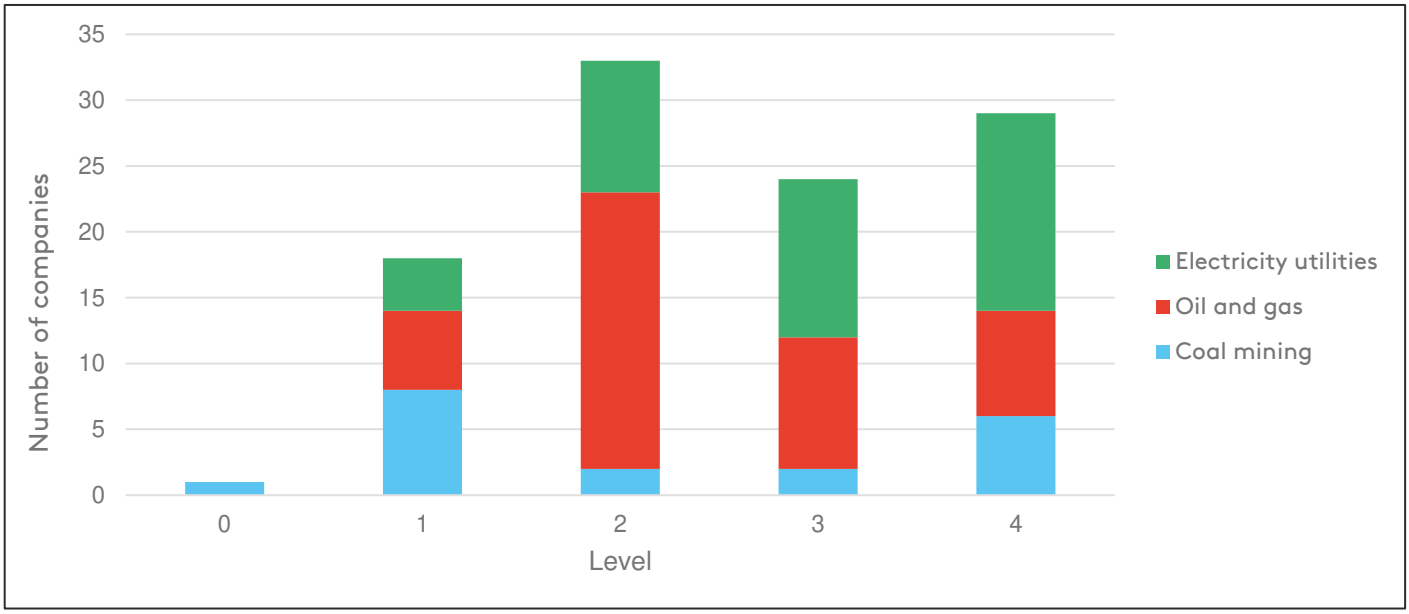
Management Quality

TPI's Management Quality framework is based on 17 indicators, each of which tests whether a company has implemented a particular carbon management practice (Yes/No), for example formalising a policy commitment to action on climate change, setting emissions targets and undertaking climate scenario planning. These 17 indicators are used to map companies on to the following five levels:

- Level 0 – Unaware of (or Not Acknowledging) Climate Change as a Business Issue.
- Level 1 – Acknowledging Climate Change as a Business Issue: the company acknowledges that climate change presents business risks and/or opportunities, and that the company has a responsibility to manage its greenhouse gas emissions. This is the point where companies adopt a climate change policy.
- Level 2 – Building Capacity: the company develops its basic capacity, its management systems and processes, and starts to report on practice and performance.
- Level 3 – Integrating into Operational Decision Making: the company improves its operational practices, assigns senior management or board responsibility for climate change and provides comprehensive disclosures on its carbon practices and performance.
- Level 4 – Strategic Assessment: the company develops a more strategic and holistic understanding of risks and opportunities related to the low-carbon transition and integrates this into its business strategy decisions.

Figure ES1. Management quality of public companies in coal mining, electricity, and oil and gas. Headline numbers (top panel) and shares by sector (bottom panel)





The average company assessed in this report is just transitioning from Level 2 to 3 (Figure ES1), in other words from building capacity to manage climate change, to integrating the issue into operational decision making. Such a company has explicitly recognised climate change as a business risk/opportunity and made a policy commitment to action, and is at the point of setting an emissions reduction target and disclosing operational emissions.

Roughly 30% of companies have gone much further than this, reaching Level 4, and six companies satisfy all the management indicators; we call these 4* companies (Table ES1).

Table ES1. Four star companies on TPI's Management Quality framework

4* Company	Sector
AGL Energy	Electricity
Anglo American	Coal mining (general mining)
BHP Billiton	Coal mining (general mining)
Equinor (formerly Statoil)	Oil and gas
National Grid	Electricity
Repsol	Oil and gas

Electricity utilities score highest on Management Quality on average, followed by oil and gas producers, with coal mining companies scoring lowest. Many pure play coal mining companies remain stuck on Level 1, mainly because they do not yet have a policy commitment to action on climate change. By contrast, all the general mining companies included in this report are on Levels 3 or 4. Many oil and gas producers are on Level 2, because they are yet to set emissions reduction targets.

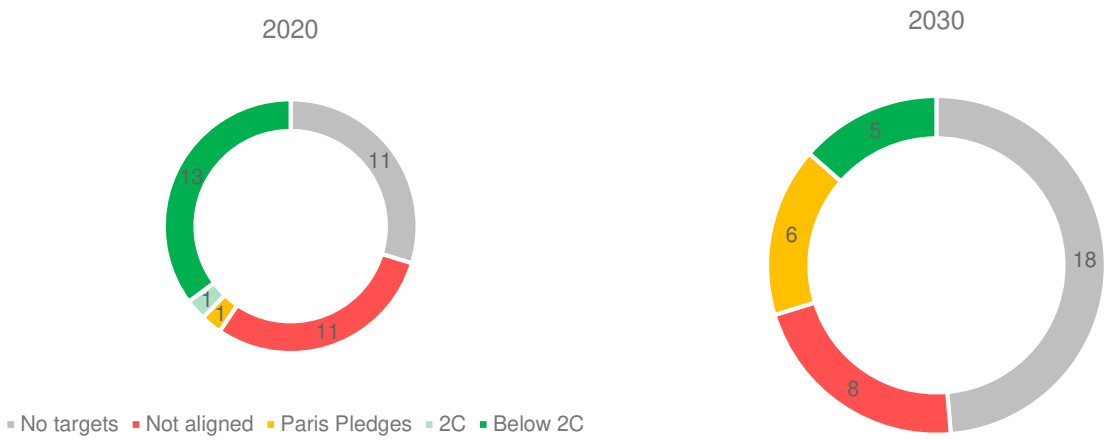
All three sectors have improved since 2017, with the largest average improvement in oil and gas. Of the 54 companies that were also assessed last year, 17 have moved up and 3 have moved down. Companies that have moved up have done so by implementing new carbon management practices, in particular explicitly recognising climate change as a business risk/opportunity, and setting emissions reduction targets. There is more progress at the lower levels.

Carbon Performance

TPI's Carbon Performance assessment translates emissions targets made at the international level under the 2015 UN Paris Agreement into benchmarks, against which the performance of individual companies can be compared. We take a take sector-by-sector approach, recognising that different sectors of the economy face different challenges arising from the low-carbon transition, including where emissions are concentrated in the value chain and how costly it is to reduce emissions.

In this report we assess the Carbon Performance of 37 electricity utilities that have a significant electricity generation business. The results demonstrate the continuing shortfall of emissions targets that TPI can use to assess the Carbon Performance of electricity utilities (Figure ES2), even if targets are more prevalent in the electricity sector than they are in most other sectors TPI has assessed to date.

Figure ES2. Alignment of electricity utilities' emissions intensity with international emissions targets in selected years



More encouraging is the finding that over half of the company targets that are in place in the electricity sector are ambitious enough to align with the Paris Pledges (NDCs) in 2020, and most of them are even ambitious enough to align with a Below 2 Degrees scenario (Figure ES2). In 2030, still more than half of company targets are aligned with the Paris Pledges, but only five company targets are aligned with Below 2 Degrees: E.ON, EDF, Enel, Iberdrola and SSE.

This implies that companies' targets are often ambitious, but by 2030 they are struggling to keep pace with the decarbonisation necessary to deliver the Paris Agreement's overall objective. We found a similar pattern last year.

TPI does not currently assess the Carbon Performance of companies in the coal mining and oil and gas sectors. This is due to a lack of company emissions targets in these two sectors that encompass downstream emissions from use of sold products, i.e. burning coal, oil and gas for energy in buildings, electricity, industry and transport. The vast majority of lifecycle emissions in these sectors stem from such use of companies' sold products.

In March 2018 we published a discussion paper, which sets out a proposal for how Carbon Performance could be assessed in the oil and gas sector in future.[1] Its central premise is that oil and gas producers are engaged in primary energy supply and therefore that the appropriate measure of carbon performance in the sector is the lifetime carbon intensity of primary energy supply. IEA projects that in a 2 Degrees scenario this carbon intensity will fall by two thirds between now and 2050.

In conclusion, TPI's latest assessment demonstrates measurable progress over the past 18 months, particularly in corporate carbon management. Many companies have now implemented a wide range of carbon management practices and have a strategic approach to climate change. Increasing numbers of electricity utilities are making the transition to renewable energy.

However, most companies still do not take a strategic approach to climate change, and most electricity utilities either do not have quantitative, long-term emissions targets, or their targets do not keep pace with what the Paris Agreement requires. Therefore there remains much to be done.

1. Introduction

About the Transition Pathway Initiative

The Transition Pathway Initiative (TPI) is a global initiative led by asset owners and supported by asset managers. Established in January 2017, TPI investors now collectively represent over UK£7/US$9.3 trillion of assets under management.[1]

On an annual basis, TPI assesses how companies are preparing for the transition to a low-carbon economy in terms of their:

- Management Quality – all companies are assessed on the quality of their governance/management of greenhouse gas emissions and of risks and opportunities related to the low-carbon transition.
- Carbon Performance – in selected sectors, TPI quantitatively benchmarks companies' carbon emissions against the international targets and national pledges made as part of the 2015 UN Paris Agreement.

TPI publishes the results of its analysis through an open access online tool hosted by the Grantham Research Institute on Climate Change and the Environment at the London School of Economics (LSE): www.transitionpathwayinitiative.org.

Investors are encouraged to use the data, indicators and online tool to inform their investment research, decision making, engagement with companies, proxy voting and dialogue with fund managers and policy makers, bearing in mind the Disclaimer that can be found in the inside front cover. Further details of how investors can use TPI assessments can be found on our website at www.lse.ac.uk/GranthamInstitute/tpi/about/how-investors-can-use-tpi/.

This report

This latest TPI report assesses the Management Quality and Carbon Performance of 105 of the world's largest and highest-emitting public companies in three sectors of critical importance to climate change: coal mining, electricity and oil and gas.

It updates assessments published by TPI in 2017, enabling us to track companies' progress, and extends coverage in the electricity sector from 20 to 41 companies and in the oil and gas sector from 20 to 45 companies. We also cover 19 of the world's largest publicly listed mining companies that were engaged in mining coal in 2017/18.

All 105 companies are assessed on Management Quality, while we assess the Carbon Performance of 37 electricity utilities with a significant electricity generation business.

In each sector, TPI looks at the largest public companies globally, on the basis of market capitalisation. These companies usually constitute the largest holdings in investor portfolios. We also cover a number of smaller companies that have been selected for engagement by the Climate Action 100+ Initiative on the basis of their aggregate, lifecycle greenhouse gas emissions.[2] These companies are systemically important for climate change. Full details of the companies assessed can be found in Appendix 1.

Brief overview of methodology

TPI assesses companies on their Management Quality and Carbon Performance, two quite different elements of how companies are approaching the low-carbon transition. The former focuses on inputs and processes, the latter on outcomes. Together these assessments are intended to provide a holistic view of companies' progress.

Management Quality

TPI's Management Quality framework is based on 17 indicators, each of which tests whether a company has implemented a particular carbon management practice (Yes/No), for example formalising a policy commitment to action on climate change, disclosing its emissions, setting emissions targets and undertaking climate scenario planning.

These 17 indicators, which are described in detail in Appendix 2, are then used to map companies on to the following five levels:

[1] As of 5 June 2018.

[2] http://www.climateaction100.org/

- *Level 0 – Unaware of (or Not Acknowledging) Climate Change as a Business Issue*.
- *Level 1 – Acknowledging Climate Change as a Business Issue*: the company acknowledges that climate change presents business risks and/or opportunities, and that the company has a responsibility to manage its greenhouse gas emissions. This is the point where companies adopt a climate change policy.
- *Level 2 – Building Capacity*: the company develops its basic capacity, its management systems and processes, and starts to report on practice and performance.
- *Level 3 – Integrating into Operational Decision Making*: the company improves its operational practices, assigns senior management or board responsibility for climate change and provides comprehensive disclosures on its carbon practices and performance.
- *Level 4 – Strategic Assessment*: the company develops a more strategic and holistic understanding of risks and opportunities related to the low-carbon transition and integrates this into its business strategy decisions.

With the exception of Level 0, companies need to be assessed as Yes on all of the questions pertaining to a level, before they can advance to the next level. The data underpinning the indicators are provided by FTSE Russell. Box 1 summarises revisions to the indicator set for this and future reports.

Carbon Performance

TPI's Carbon Performance assessment translates emissions targets made at the international level under the 2015 UN Paris Agreement into benchmarks, against which the performance of individual companies can be compared. We take a take sector-by-sector approach, recognising that different sectors of the economy face different challenges arising from the low-carbon transition, including where emissions are concentrated in the value chain and how costly it is to reduce emissions.[3]

In this report we benchmark the emissions intensity of electricity generation in the electricity sector against three scenarios that are derived from modelling by the International Energy Agency (IEA):

- *Paris Pledges*, consistent with the emissions reductions pledged by countries as part of the Paris Agreement in the form of Nationally Determined Contributions or NDCs.
- *2 Degrees*, consistent with the overall aim of the Paris Agreement to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels", albeit at the low end of the range of ambition.
- *Below 2 Degrees*, consistent with a more ambitious interpretation of the Paris Agreement's overall aim.

Appendix 3 describes the methodology in more detail.

[3] The approach is similar to that employed by the Science Based Targets Initiative.

Box 1. Revisions to TPI's Management Quality framework for 2018, and correspondence with TCFD

TPI's Management Quality framework has been revised for this report. Based on feedback from TPI's Steering Group and its Technical Advisory Group, and enabled by new ESG data collected by FTSE Russell, five new questions have been added:

- Does the company have a process to manage climate-related risks? (Level 3)
- Does the company disclose materially important Scope 3 emissions? (Level 3, for selected sectors only)
- Does the company incorporate climate change risks and opportunities in their strategy? (Level 4)
- Does the company undertake climate scenario planning? (Level 4)
- Does the company disclose an internal price of carbon? (Level 4)

Together these new questions help bring TPI's Management Quality framework into full alignment with the recommendations of the FSB Taskforce on Climate-related Financial Disclosures (TCFD). TCFD's recommendations are in four areas: governance, strategy, risk management, and metrics and targets. The revised Management Quality framework includes multiple indicators in each of these four areas, while our separate Carbon Performance assessment is focused on metrics and targets specifically.

The new question on materially important Scope 3 emissions enables TPI to better differentiate companies in terms of the comprehensiveness and quality of their Scope 3 disclosures, where these command a large share of companies' lifecycle greenhouse gas emissions.

We have deleted two questions from the 2017 framework. They are:

- Has the company reduced its total Scope 1 and 2 greenhouse gas emissions over the past 3 years? Deleting this question enables a cleaner separation of management practices from emissions performance.
- Does the company provide information on business costs associated with climate change? This question has been replaced with the question about internal carbon pricing.

Two minor modifications have also been made to existing questions:

- Question 2 has changed from "Does the company explicitly recognise climate change as a significant issue for the business?" to "Does the company explicitly recognise climate change as a relevant risk and/or opportunity for the business?", reflecting a change in how FTSE Russell captures the underlying data, intended to bring the framework more closely into line with TCFD.
- Question 4 now relates to greenhouse gas emissions reductions specifically (rather than emissions and/or energy use) and Questions 7 and 13 now relate to emissions reductions across Scopes 1, 2 and/or 3, again reflecting changes in how FTSE Russell captures the underlying data.

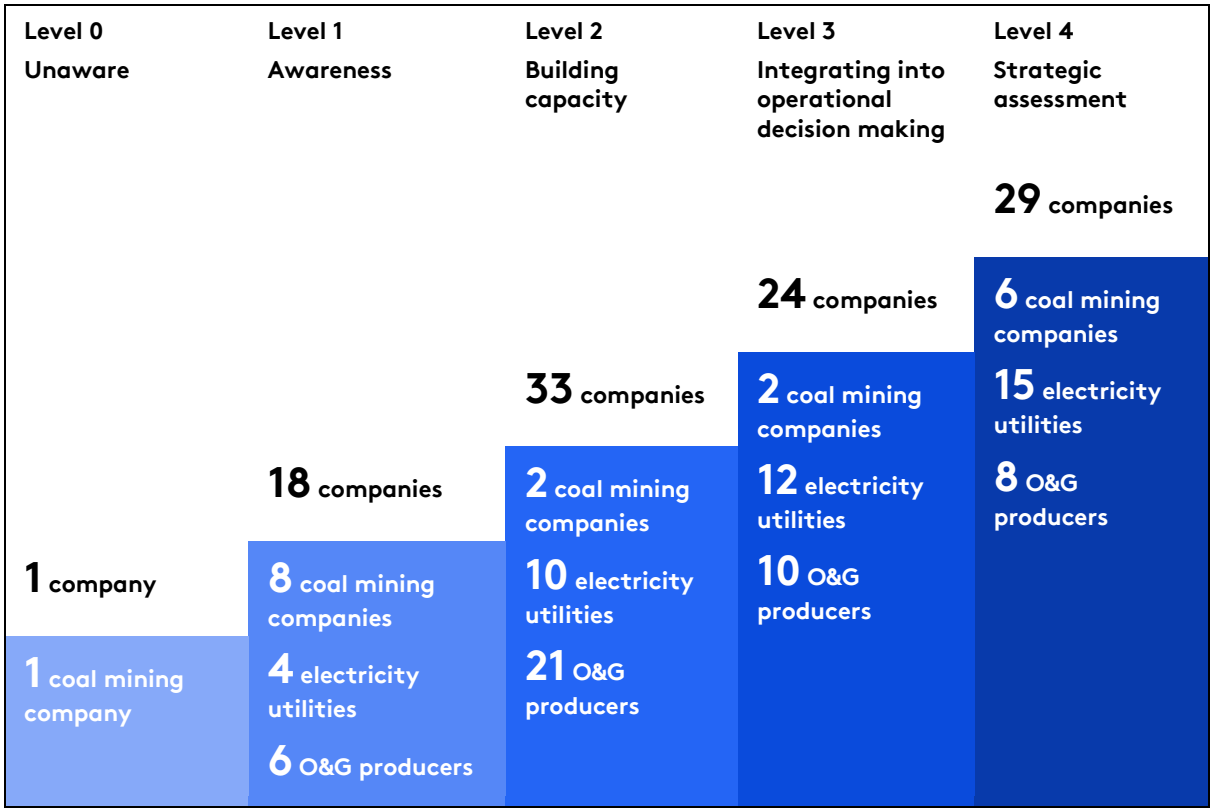
Further details, including a mapping of the framework to the TCFD recommendations, can be found in our latest Methodology and Indicators Report.[2]

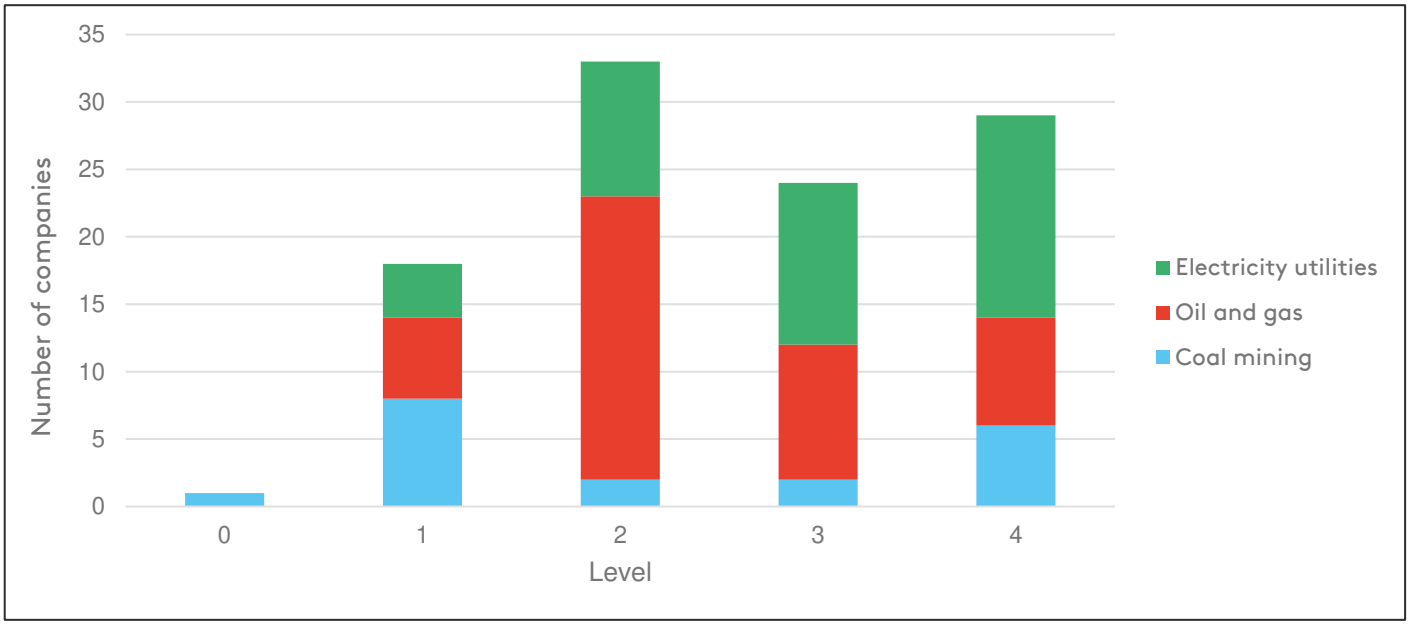
2. Overview of results

Management Quality in coal mining, electricity, and oil & gas

This section provides an overview of the results of our Management Quality assessment, looking at the coal mining, electricity, and oil and gas sectors together, while drawing out the key differences between them. Nineteen mining companies are assessed, as well as 41 electricity utilities and 45 oil and gas producers. Figure 1 shows the number of companies on each Management Quality level.

Figure 1. Management quality of public companies in coal mining, electricity, and oil and gas. Headline numbers (top panel) and shares by sector (bottom panel)





Only one company is on Level 0 – Unaware of (or not Acknowledging) Climate Change as a Business Issue. This is the coal mining company Shougang Fushan Resources, listed in Hong Kong.

Eighteen (18) companies are on Level 1 – Acknowledging Climate Change as a Business Issue. Most companies on this level have a climate change policy in place, but do not explicitly recognise climate change as a relevant risk and/or opportunity for the business. A few companies do the opposite, alluding to the materiality of climate change, without having a policy commitment to action.

Thirty-three (33) companies are on Level 2 – Building Capacity. Companies on this level have a climate change policy in place and have explicitly recognised climate change as a relevant risk/opportunity. But either they do not disclose their operational greenhouse gas emissions (i.e. Scope 1 and 2), and/or they have not set any targets to reduce their emissions in absolute or relative terms (even unquantified targets). More companies are on Level 2 than any other level; 31% of all 105 companies.

Twenty-four (24) companies are on Level 3 – Integrating into Operational Decision Making. These companies disclose their operational emissions and have set emissions reduction targets. Most have gone beyond this to implement some, but not all, of the following carbon management practices: assign board responsibility for climate change; set quantitative emissions targets; disclose some value-chain (i.e. Scope 3) emissions and, where they are material, specifically disclose emissions from use of sold products (coal mining, and oil and gas, only); have operational emissions data verified; support domestic and international efforts to mitigate climate change; introduce a process to manage climate-related risks.

Twenty-nine (29) companies have made it to Level 4 – Strategic Assessment. These companies satisfy all TPI's indicators on Levels 0-3 and are undertaking some, but usually not all, of the following: setting quantitative, long-term emissions targets; incorporating ESG issues into executive remuneration; incorporating climate change risks and opportunities in company strategy; undertaking climate scenario planning; disclosing their internal carbon price.

Six companies satisfy all of the TPI indicators for their sector. We refer to these as four star companies (Table 1).

At the sector level, electricity utilities fare best, with relatively more companies on Levels 3 and 4 (see Figure 1) and an average level score of 2.9, compared with 2.4 in oil and gas and just 2.2 in coal mining.

Many pure play coal mining companies remain stuck on Level 1, mainly because they do not yet have a policy commitment to action on climate change. By contrast, all the general mining companies included in this report are on Levels 3 or 4. Many oil and gas producers are on Level 2, because they are yet to set emissions reduction targets. Most electricity utilities are on Levels 3 and 4.

Table 1. Four star companies on TPI's Management Quality framework

4* Company	Sector
AGL Energy	Electricity
Anglo American	Coal mining (general mining)
BHP Billiton	Coal mining (general mining)
Equinor (formerly Statoil)	Oil and gas
National Grid	Electricity
Repsol	Oil and gas

At the sector level, electricity utilities fare best, with relatively more companies on Levels 3 and 4 (see Figure 1) and an average level score of 2.9, compared with 2.4 in oil and gas and just 2.2 in coal mining.

Many pure play coal mining companies remain stuck on Level 1, mainly because they do not yet have a policy commitment to action on climate change. By contrast, all the general mining companies included in this report are on Levels 3 or 4. Many oil and gas producers are on Level 2, because they are yet to set emissions reduction targets. Most electricity utilities are on Levels 3 and 4.

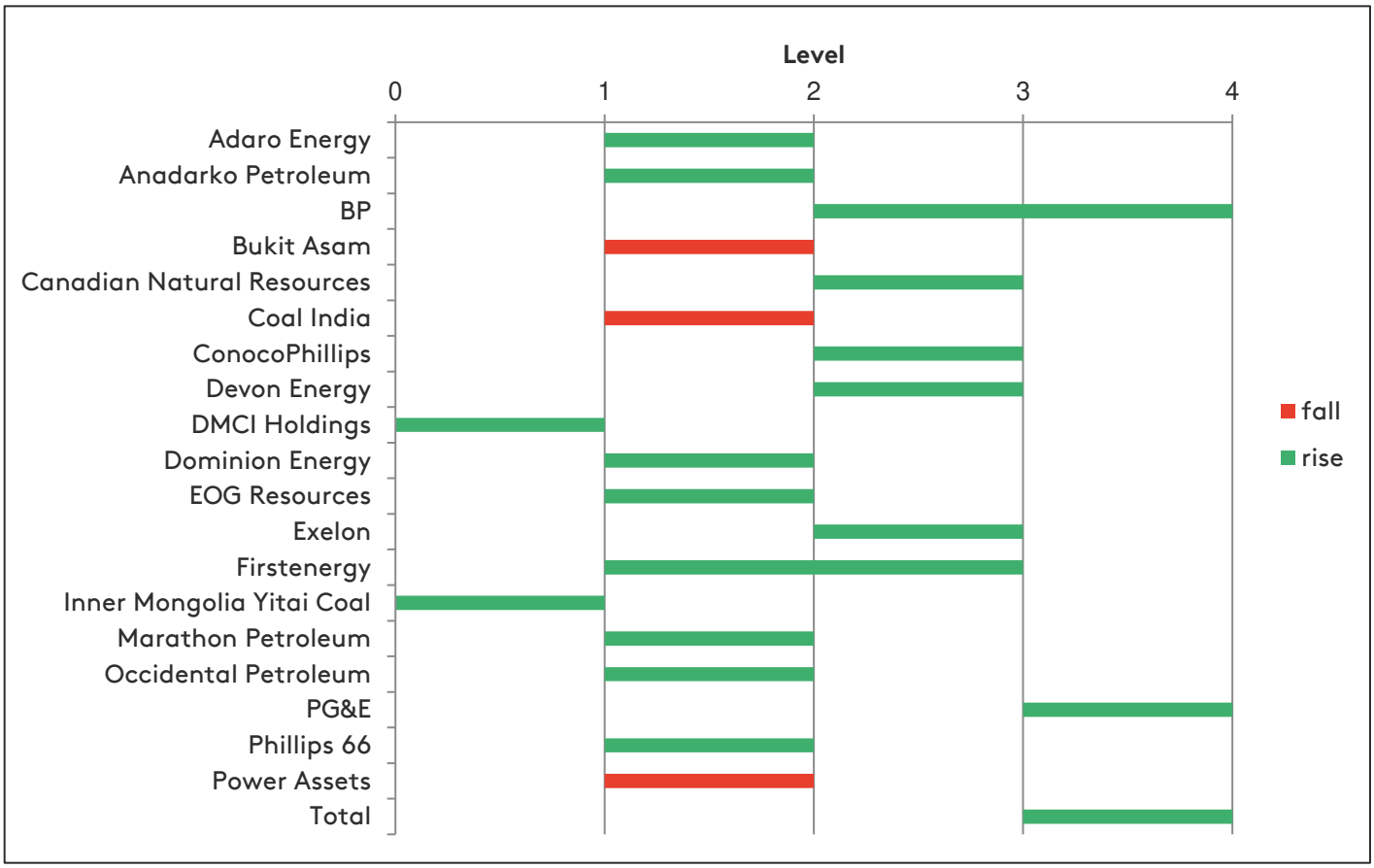
Trends in Management Quality

Overall, we have seen an improvement in companies' Management Quality since TPI's first analysis of these three sectors in 2017.[4]

All three sectors have improved on their average level scores in 2017, with the largest improvement in oil and gas, up from 2.0 to 2.4 primarily due to an improvement in Management Quality among the largest companies.

Figure 2 lists companies that have moved up or down the Management Quality staircase since first being assessed by TPI in 2017. Of the 54 companies assessed in 2017 and 2018, 20 have moved level and 17 of these have progressed to a higher level.

Figure 2. Companies that have moved up or down levels since the TPI 2017 assessment



All of the companies that have climbed to a higher level on the staircase have done so by introducing new carbon management practices, i.e. by improving their Management Quality:

- Ten companies, including eight oil and gas producers, climb above Level 0 or Level 1 by explicitly recognising climate change as a business risk/opportunity.
- A further seven companies, including five oil and gas producers, climb above Level 2 by virtue of setting emissions reduction targets. In the case of BP, setting a quantitative,

[4] Electricity utilities and oil and gas producers were previously assessed in January 2017, while the coal mining sector was assessed in July 2017.

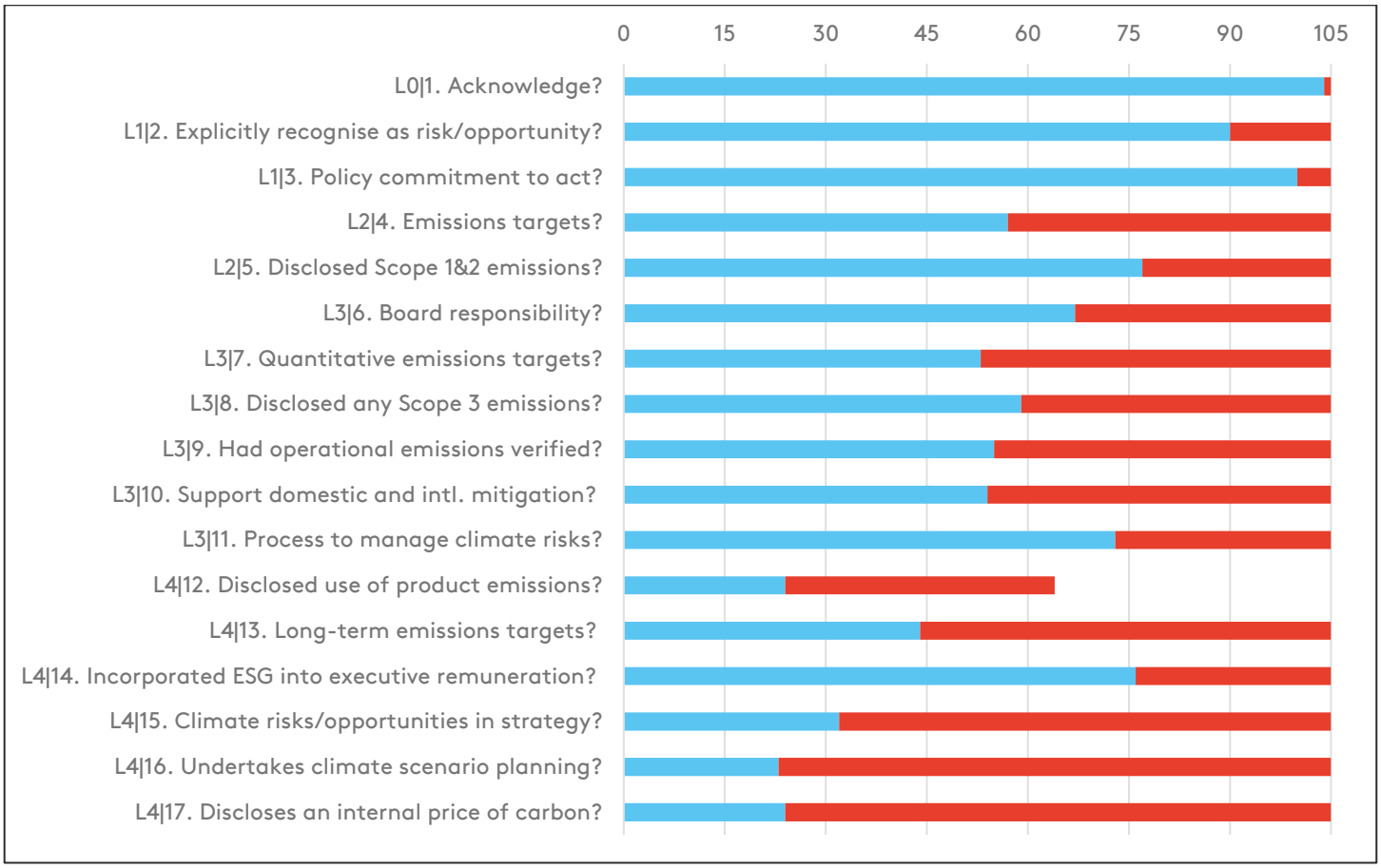
long-term emissions reduction target lifts the company from Level 2 to 4.

Three companies fall from Level 2 to 1, because they are assessed as not explicitly recognising climate change as a business risk/opportunity. This may reflect a change in methodology from 2017, when the equivalent question was "Does the company explicitly recognise climate change as a significant issue for the business?" This year the question has a risk framing, in line with the recommendation of TCFD.

Indicator by indicator

When companies' Management Quality is viewed indicator by indicator (Figure 3), we see a greater proportion of companies across the three sectors carrying out the basic carbon management practices associated with Levels 0 to 2, and fewer companies implementing the more advanced practices associated with Levels 3 and 4.

Figure 3. Number of companies across all sectors scoring Yes (blue) against individual criteria, and No (red)



One hundred companies out of 105 have a policy commitment to act on climate change and 90 companies explicitly recognise climate change as a relevant business risk/opportunity. Most companies now disclose their operational emissions (77/105) and have allocated board responsibility for climate change (67/105).

Of the more advanced practices, it is notable that 70% of companies (73/105) have a process in place to manage climate-related risks, and 72% (76/105) have incorporated ESG issues into executive remuneration.

Progress is particularly weak on three practices associated with Level 4. Two of these constitute new criteria introduced by TPI in 2018 to reflect the recommendations of the TCFD in the area of strategy: incorporating climate change risks and opportunities in company strategy (32/105) and undertaking climate scenario planning (23/105). In addition, only 24 out of 105 companies disclose an internal price of carbon. Still only 54% of companies (57/105) have set any kind of target to reduce their emissions.

Carbon Performance of electricity utilities

The second approach TPI takes to assessing companies on the low-carbon transition is Carbon Performance. This is a quantitative benchmarking of companies' emissions pathways against the international targets and national pledges made as part of the 2015 UN Paris Agreement.

In this report, we assess the Carbon Performance of 37 electricity utilities that have a significant electricity generation business. The results demonstrate that there continues to be a shortfall of emissions targets TPI can use to assess the Carbon Performance of electricity utilities, even if targets are more prevalent in the electricity sector than they are in most other sectors TPI has assessed to date. Of the 37 companies assessed, 26 have targets extending to at least 2020, but only 19 have targets encompassing 2030. This is, however, an improvement on the share of companies with long-term emissions targets in our 2017 report on the sector.

In terms of the ambition of utilities' targets, it is encouraging to see that more than half of the company targets are aligned with the Paris Pledges in 2020, and most of them are even aligned with Below 2 Degrees (Figure 4). In 2030, still more than half of the company targets are aligned with the Paris Pledges, but only five companies do enough to be aligned with Below 2 Degrees: E.ON, EDF, Enel, Iberdrola and SSE. This implies that companies' targets are often ambitious, but by 2030 they are struggling to keep pace with the decarbonisation necessary to deliver the Paris Agreement's overall objective. We found a similar pattern last year.

The largest global utilities are predominantly based in the USA and Europe and as such they have a lower emissions intensity on average than utilities in emerging markets, and relative to the global average. This makes it easier for them to align with global benchmarks. The EU's Below 2 Degrees benchmark is particularly low.

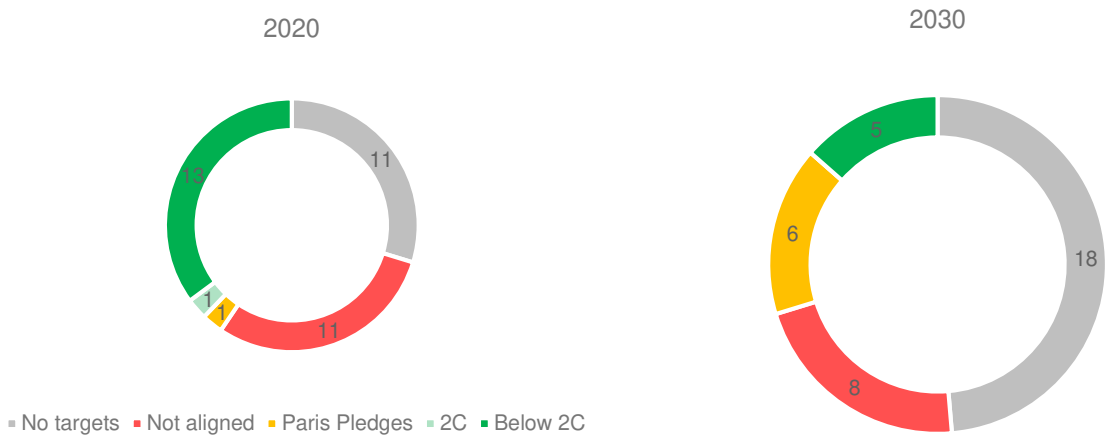
Carbon Performance in coal mining, and oil and gas

TPI does not currently assess the Carbon Performance of companies in the coal mining and oil and gas sectors. This is due to a lack of company emissions targets in these two sectors that encompass downstream emissions from use of sold products, i.e. burning coal, oil and gas for energy in buildings, electricity, industry and transport. The vast majority of lifecycle emissions in these sectors stem from such use of companies' sold products, so it is imperative that they are included in the analysis.

In March 2018 we published a discussion paper, which sets out a proposal for how Carbon Performance could be assessed in the oil and gas sector in future.[1] Its central premise is that oil and gas producers are engaged in primary energy supply and therefore that the appropriate measure of carbon performance in the sector is the lifetime carbon intensity of primary energy supply. IEA projects that in a 2 Degrees scenario this carbon intensity will fall by two thirds between now and 2050.

We test the concept using recent disclosures from a small number of oil and gas producers, who are beginning to embrace a low-carbon strategy for the long term that will see them reduce their carbon intensity of primary energy supply, or otherwise provide information about long-term production and sales. We also set out minimum disclosures that we think should be provided by all oil and gas companies. A similar approach could be followed in the coal mining sector and we continue to work with both sectors to develop and embed these approaches.

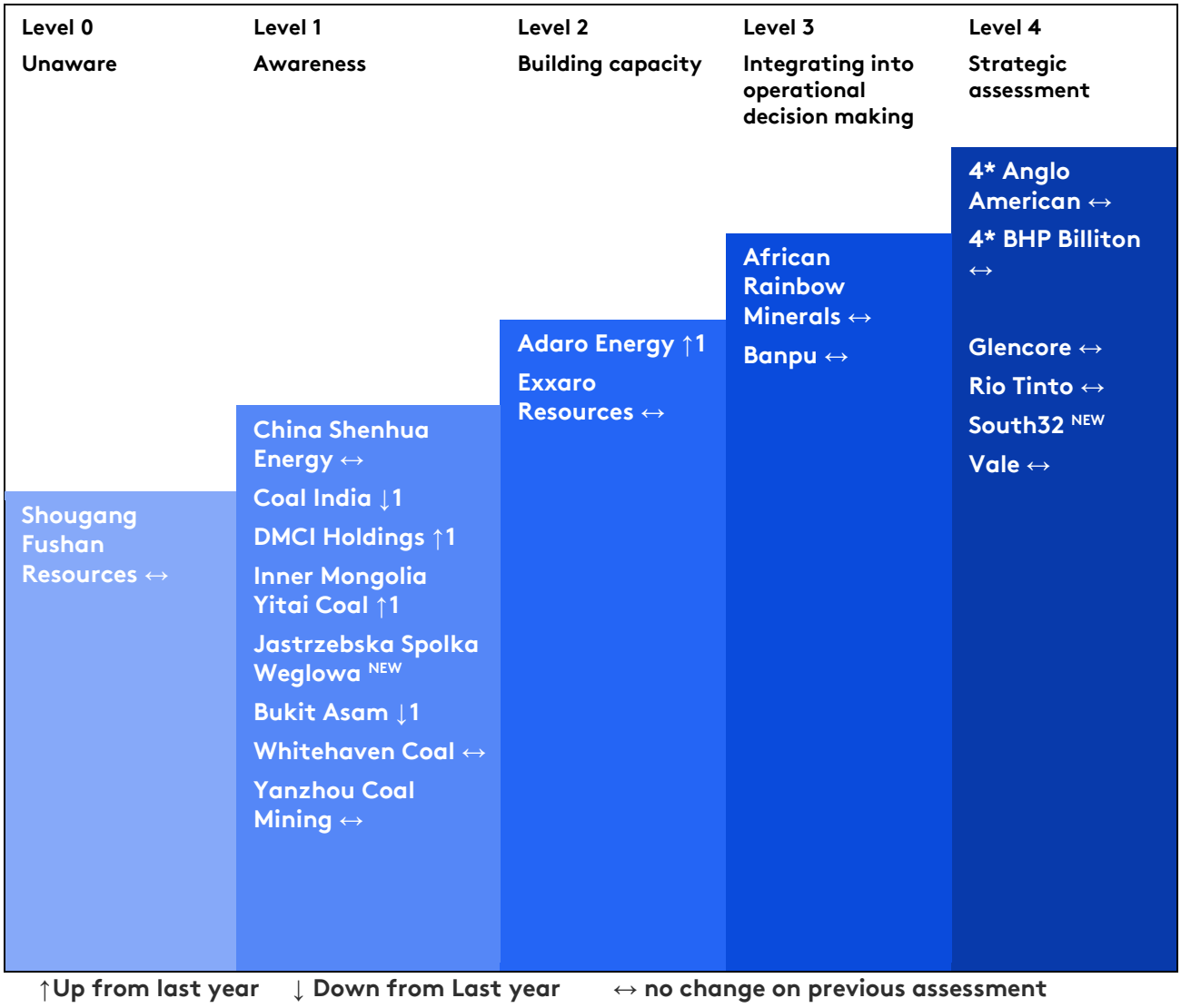
Figure 4. Alignment of electricity utilities' emissions intensity with international emissions targets in selected years



3 . Management quality of coal mining companies

This TPI assessment looks at 19 of the world's largest mining companies, by market capitalisation, which were engaged in mining coal in 2017/18. This group includes seven general mining companies and 12 companies specialised in mining coal.

Figure 5. Management Quality of 19 of the world's largest companies engaged in mining coal in 2017/18



Overall results

Figure 5 shows where the 19 companies sit on the TPI Management Quality staircase. The TPI online tool provides a question-by-question assessment of each company.[5]

One company is on Level 0 – Unaware of (or Not Acknowledging) Climate Change as a Business Issue. This is the coal mining company Shougang Fushan Resources, listed in Hong Kong. This means it does not: (a) have a policy or commitment statement on climate change that

[5] http://www.lse.ac.uk/GranthamInstitute/tpi/the-toolkit/

commits it to addressing the issue; (b) demonstrate recognition of climate change as a relevant risk/opportunity to the business; (c) have emissions reduction targets; or (d) disclose its Scope 1 and 2 greenhouse gas emissions.

Eight companies are on Level 1 – Acknowledging Climate Change as a Business Issue. In seven cases, these companies have in place a policy on climate change, but despite this they do not explicitly recognise climate change as a relevant business risk/opportunity. The exception is DMCI Holdings, which does the opposite.

Two companies are on Level 2 – Building Capacity. They are Adaro Energy and Exxaro Resources, but their Management Quality profiles are in fact quite different. Adaro Energy scrapes into Level 2 by virtue of having a climate change policy in place and explicitly recognising climate change as a business risk/opportunity, but it does not satisfy any other criterion on Level 2 or above. By contrast, Exxaro Resources satisfies 13 of 17 criteria in all, but is stuck on Level 2 since it has not set an emissions reduction target.

Two companies are on Level 3 – Integrating into Operational Decision Making. African Rainbow Minerals satisfies all Level 3 criteria, except it does not disclose Scope 3 emissions from use of sold products, a key disclosure for companies engaged in fossil fuel extraction. Banpu, the Thai coal mining specialist, only satisfies two Level 3 criteria, those relating to assigning board responsibility for climate change and having set a long-term quantitative emissions target.

Six companies are on Level 4 – Strategic Assessment. These include all the large cap general mining companies.

Anglo American and BHP Billiton are both 4* companies as they satisfy all of the indicators.

Coal mining has the lowest average Management Quality score of the three sectors assessed in this report; 2.2, equivalent to Level 2, Building Capacity. However, only two mining companies are actually on Level 2. Instead, there is a cluster of eight relatively high-performing companies on Levels 3 and 4. Seven of these are general mining companies. The exception is Banpu. By contrast, the 12 pure play coal mining companies are (Banpu aside) on Levels 0 to 2, with most on Level 1.

Trends in company Management Quality

Figure 5 also tracks the progress of companies that featured in TPI's assessment of coal mining from July 2017.[3] Seventeen companies were also covered last year, with two new additions this year: Jastrzebska Spolka Weglowa, and South32.

Five companies have moved up or down by one level since 2017. The three movements up appear to be attributable to improvements in the relevant companies' management practices, while the two movements down appear to be attributable to changes to the Management Quality methodology:

- DMCI Holdings and Inner Mongolia Yitai Coal have both moved from Level 0 to 1, by respectively demonstrating explicit recognition of climate change as a relevant risk/opportunity to the business, and introducing a climate change policy.
- Adaro Energy progresses from Level 1 to 2 by introducing a climate change policy.
- Coal India and Bukit Asam fall from Level 2 to 1, because they are no longer assessed as Yes on question 2. This may reflect a change in methodology, as question 2 has evolved from "Does the company explicitly recognise climate change as a significant issue for the business?" to "Does the company explicitly recognise climate change as a relevant risk and/or opportunity for the business?"

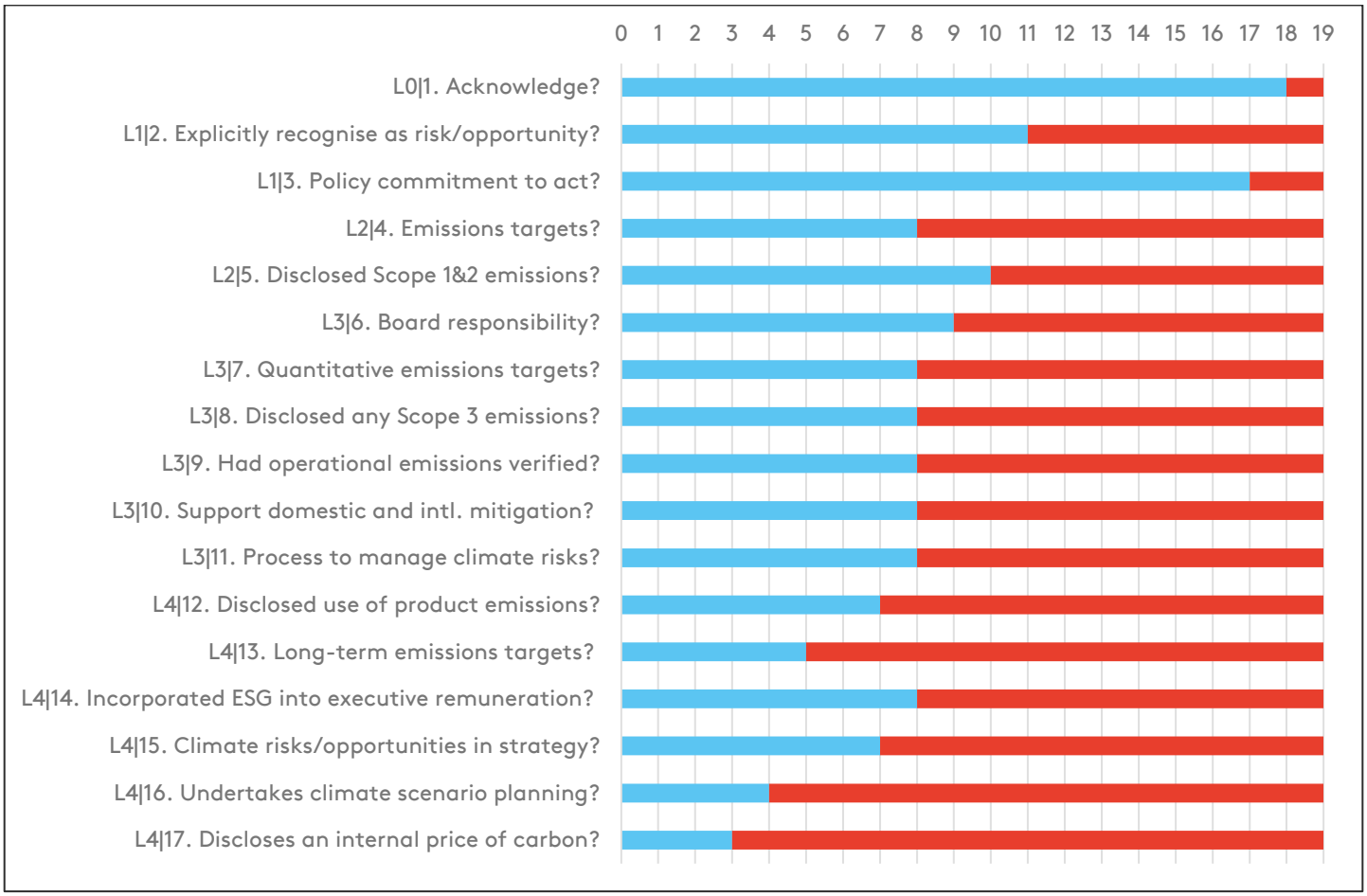
Indicator by indicator

Figure 6 looks at how the 19 coal mining companies perform against the 17 individual criteria/questions. Besides having a policy commitment to act on climate change (which in turn ensures companies are assessed as acknowledging climate change as a business issue), only two other criteria are met by a majority of companies in this sector: explicit recognition of climate change as a relevant risk/opportunity for the business, and disclosure of operational emissions.

Coal mining companies perform worse than electricity utilities and oil and gas producers on almost all criteria, however a higher proportion of coal mining companies (led by the general mining companies) have set quantitative emissions targets than oil and gas producers (short- or long-term), and more coal mining companies incorporate climate change risks and opportunities in company strategy than oil and gas producers.

Only seven coal mining companies disclose emissions from use of sold products, despite their importance to these companies' lifecycle carbon footprints.

Figure 6. Number of companies in the coal mining sector scoring Yes (blue) against individual questions, and No (red)



4. Management Quality and Carbon Performance of electric utilities

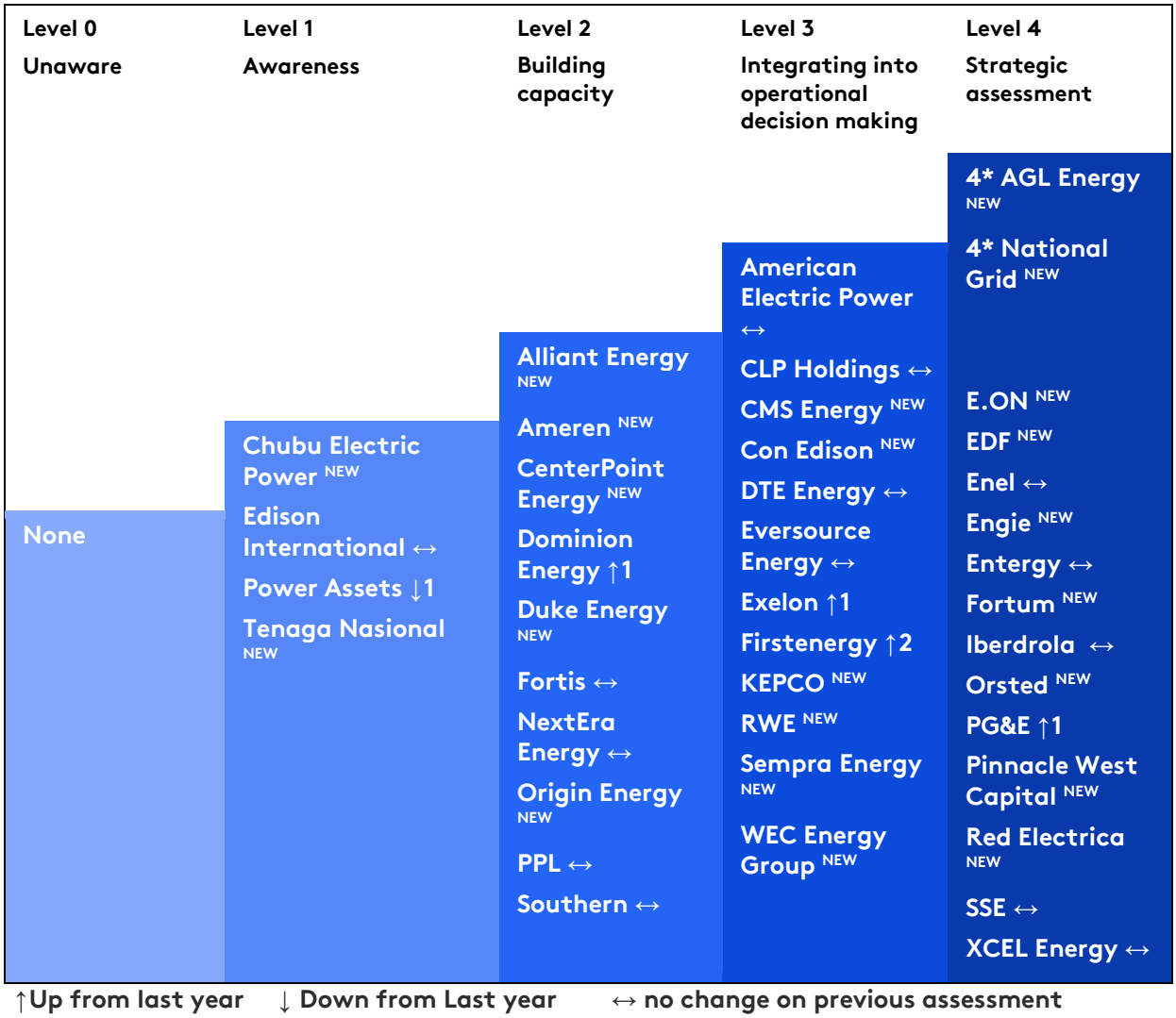
This TPI assessment includes 41 electricity utilities from both the conventional electricity and multi-utilities sub-sectors. We select companies mainly on the basis of large market capitalisation. These companies usually constitute the largest holdings in investor portfolios. We also include an additional two smaller companies, which are subject to investor engagement as part of the Climate Action 100+ Initiative: KEPCO and EDF. These companies are systemically important for climate change.

Of the 41 electricity utilities we assess on Management Quality, 37 can also be assessed on Carbon Performance, because they have a significant electricity generation business (the remaining four utilities are specialised in electricity transmission and distribution).

Overall results for Management Quality

Figure 7 shows where the 41 companies sit on the TPI Management Quality staircase. The TPI online tool provides a question-by-question assessment of each company.

Figure 7. Management Quality of 41 large and high-emitting electricity utilities



There are no electricity utilities on Level 0.

Four companies are on Level 1 – Acknowledging Climate Change as a Business Issue. Of these four companies, Edison International fails to progress as it does not have a policy commitment to act on climate change, while the other three companies have a policy commitment to act, but fail to demonstrate that they explicitly recognise climate change as a relevant business risk/opportunity.

Ten companies are on Level 2 – Building Capacity. Of these, three companies disclose their Scope 1 and 2 emissions, but fail to progress because they have not yet set an emissions reduction target: Ameren, Fortis and Origin Energy. Conversely Alliant Energy, Dominion Energy and Duke Energy have set emissions targets, but fail to progress due to not disclosing their Scope 1 and 2 emissions. The remaining four companies satisfy neither of these Level 2 criteria.

Twelve (12) companies are on Level 3 – Integrating into Operational Decision Making. The reasons for these companies failing to progress to Level 4 are diverse. The question on which these 12 companies are most commonly assessed as No is: has the company had its operational (i.e. Scope 1 and/or 2) emissions data verified? Only five of 12 companies have done so. The remaining Level 3 criteria are met by most of the 12 companies and all 12 companies have a process to manage climate-related risks. Question 12 does not apply to the electricity sector as most of the lifecycle emissions of a utility are within Scopes 1 and 2.

Fifteen (15) companies, more than one third of the sample, are on Level 4 – Strategic Assessment. All 15 of these companies have set a quantitative, long-term emissions target and incorporated ESG issues into executive remuneration. However, in line with the coal mining and oil and gas sectors, relatively few companies have incorporated climate change risks/opportunities into their strategy, undertake climate scenario planning, or disclose an internal carbon price.

Two electricity utilities are 4* companies that satisfy all 16 criteria applying to the sector: AGL Energy and National Grid.

With an average level score of 2.9, electricity has the highest Management Quality of any sector assessed by TPI to date, with the next highest being the automobile manufacturing sector, which scored 2.6 on average when assessed in February 2018.

An average level score of 2.9 puts the typical electricity utility closest to Level 3, integrating climate change into operational decision-making. This means the typical company in this sector has at least done all of the following: established a climate change policy; explicitly recognised climate change as a relevant business risk/opportunity; disclosed Scope 1 and 2 emissions; and set an emissions reduction target of some form. Most utilities go well beyond this in the areas of policy, disclosure, targets and/or strategy.

Trends in company Management Quality

Of the 19 electricity utilities that were also assessed by TPI in 2017, 14 stay on the same level, while four move up by at least one level:

- Dominion Energy progresses from Level 1 to 2 by demonstrating explicit recognition of climate change as a business risk/opportunity.
- Exelon progresses from Level 2 to 3 by setting an emissions reduction target.
- Firstenergy moves up two levels from 1 to 3 by introducing a policy commitment to action on climate change and publishing information on its Scope 1 and 2 emissions.
- PG&E progresses from Level 3 to 4 by setting a quantitative emissions target.

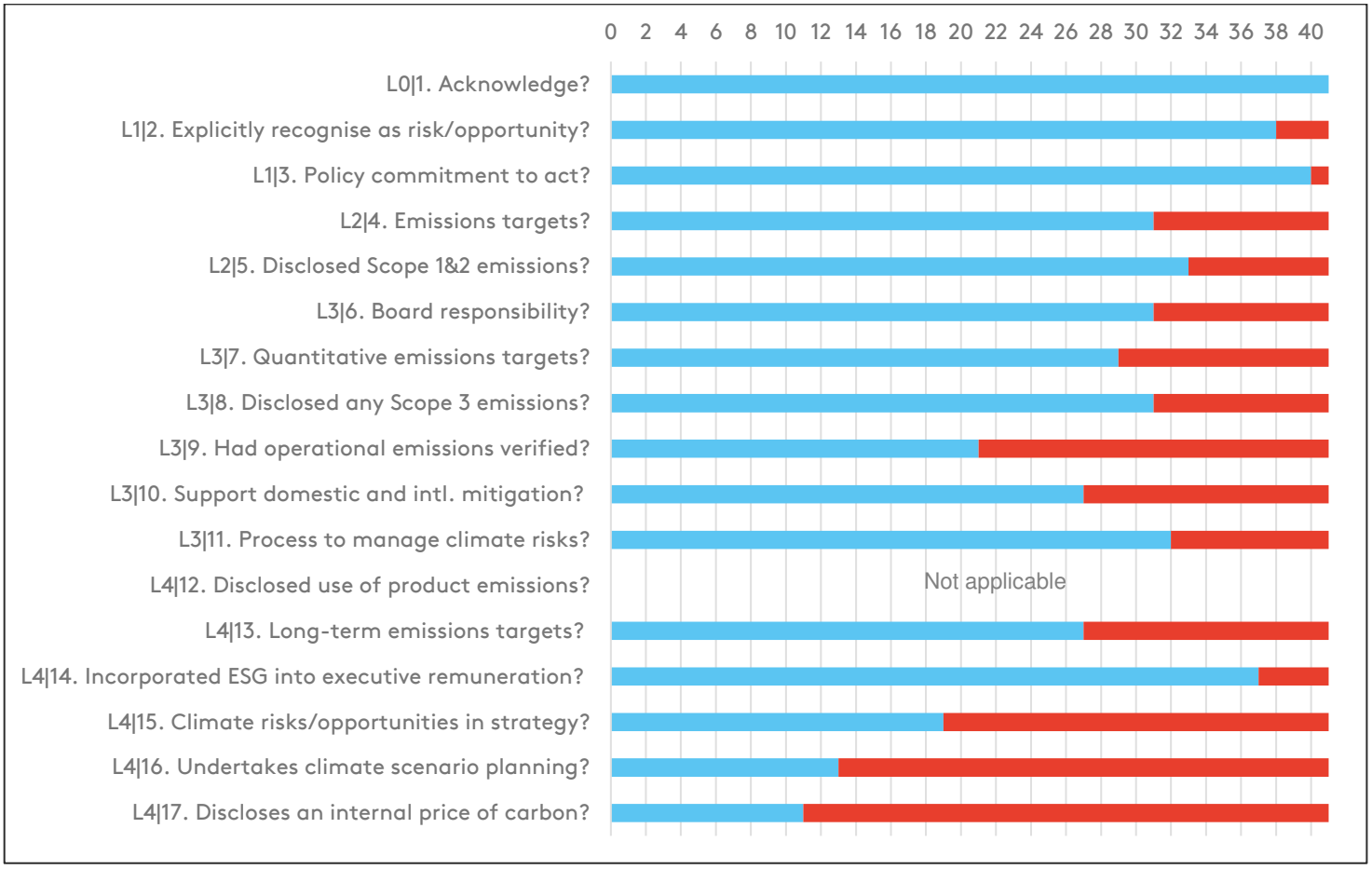
Power Assets moves down from Level 2 to 1 due to being assessed as No on question 2 this year. This may reflect a change in methodology, as question 2 has evolved from "Does the company explicitly recognise climate change as a significant issue for the business?" to "Does the company explicitly recognise climate change as a relevant risk and/or opportunity for the business?"

Indicator by indicator

Figure 8 looks at how the 41 electricity utilities perform against the 16 individual Management Quality criteria/questions that apply to this sector. Performance is strong across the board, compared with other sectors TPI has assessed. A particularly large proportion of electricity utilities have set emissions targets and incorporate ESG into executive remuneration.

Only on one criterion is the electricity sector outperformed: relatively more oil and gas producers have had their operational emissions data verified. Only in three cases does a majority of companies in the electricity sector fail to meet a criterion. These are: (i) integrating climate risks/opportunities in company strategy, (ii) undertaking climate scenario planning and (iii) disclosing an internal carbon price. They also proved challenging for coal mining companies and oil and gas producers to meet.

Figure 8. Number of electricity utilities scoring Yes (blue) against individual questions, and No (red)



Global Carbon Performance

Table 2 summarises Carbon Performance data for the 37 electricity utilities covered by this report, which have a significant electricity generation business.[6] The traffic light scheme indicates that a company with an emissions intensity of electricity generation that is below the benchmarks can be said to be aligned with those benchmarks and therefore with the international commitments underpinning them. A company whose emissions intensity is above the benchmarks is not aligned.

Table 2. Company emissions intensity pathways and global electricity sector benchmarks, 2014-2030

Company	Emissions intensity of electricity generation (tCO_2/MWh)						
	2014	2015	2016	2017	2020	2025	2030
AGL Energy	0.958	0.948	0.968				
Alliant Energy			0.839	0.831	0.807	0.767	0.727
Ameren	0.688	0.660	0.675	0.667	0.644	0.605	0.566
American Electric Power	0.763	0.723	0.693	0.677	0.629	0.550	0.470
Chubu Electric Power	0.489	0.492	0.498	0.489	0.462	0.416	0.371
CLP	0.840	0.810	0.820	0.800	0.600	0.550	0.500
CMS Energy	0.920	0.910	0.793	0.771	0.703	0.591	
Dominion Energy	0.361	0.348	0.339	0.336	0.327	0.313	0.298
DTE Energy			0.690	0.707	0.669	0.586	0.489
Duke Energy		0.454	0.440	0.435	0.409	0.366	0.322
E.ON	0.430	0.400	0.041	0.044	0.041	0.037	0.032
EDF	0.102	0.095	0.077	0.082	0.081	0.079	0.076
Edison International	0.176	0.195	0.146				
Enel	0.388	0.404	0.388	0.377	0.342	0.285	0.228
Engie	0.434	0.447	0.395	0.385	0.354		
Entergy	0.197	0.203	0.179	0.272	0.315		
Eversource Energy	0.693	0.722	0.513				
Exelon	0.084	0.038	0.049	0.050	0.053		
Firstenergy		0.525	0.502	0.488	0.444	0.371	0.298
Fortis	0.679	0.640	0.641	0.635	0.612	0.573	0.534
Fortum	0.177	0.166	0.173	0.173			
Iberdrola	0.212	0.225	0.177	0.187	0.240	0.194	0.149
KEPCO	0.471	0.464	0.477				
NextEra Energy	0.242	0.249	0.216				
Origin Energy	0.746	0.688	0.698				
Orsted	0.227	0.162	0.176	0.111	0.079		
PG&E	0.083	0.093	0.067				
Pinnacle West Capital	0.533	0.539	0.404	0.439	0.406	0.350	0.294
Power Assets							
PPL	0.950	0.890	0.850	0.870	0.832	0.769	0.706
RWE	0.745	0.708	0.686	0.655	0.620		
Sempra Energy	0.315	0.294	0.254	0.246	0.223		
Southern Company	0.590	0.544	0.528				
SSE	0.474	0.397	0.304	0.293	0.260	0.205	0.150
Tenaga Nasional			0.539				
WEC Energy Group	0.917	0.853	0.810	0.799	0.767	0.714	0.660
XCEL Energy	0.713	0.707	0.650	0.638	0.602	0.492	0.349
Below 2 Degrees	0.572	0.546	0.521	0.497	0.430	0.330	0.229
2 Degrees	0.572	0.549	0.527	0.506	0.447	0.361	0.245
Paris Pledges	0.572	0.557	0.543	0.529	0.492	0.439	0.402

Key ● Aligned with Below 2°C ● Aligned with 2°C ● Aligned with Paris Pledges ● Not aligned

[6] Four companies are excluded on this basis: CenterPoint Energy, Con Edison, Red Electrica and National Grid. These companies are engaged in electricity transmission and distribution, but not generation.

Data availability: TPI's Carbon Performance assessment is based on companies' public disclosures of their historical emissions, as well as quantitative targets they have set to reduce their emissions in the future (see Appendix 3 for further details). Historical Carbon Performance data are available for 36 out of 37 companies. The exception is Power Assets. Twenty-six companies have also set company-wide, quantitative targets for their future emissions, which we can use to estimate Carbon Performance in 2020. Nineteen companies have useable targets extending to at least 2030.

In our 2017 assessment of electricity utilities' Carbon Performance, [4] we found that nine of the 20 companies we assessed had set emissions targets extending to 2020 or beyond, which we could use. We see a larger share this year (26 out of 37), and, of the 19 companies assessed in both 2017 and 2018, the number of companies with useable 2020 targets has risen from nine to 13, while the number of companies with useable 2030 targets has risen from six to 11.

Historical emissions intensity: 21 of the 37 companies had a historical emissions intensity[7] under the global Below 2 Degrees benchmark. On average, the 36 utilities providing data had a historical emissions intensity of 0.502 tCO_2/MWh, which is also under the global Below 2 Degrees benchmark over the historical period (2013-17).

2020 Carbon Performance: assuming company targets are met, 13 out of the 26 utilities with 2020 performance data will be aligned with the global Below 2 Degrees benchmark. Firstenergy will be aligned with the 2 Degrees benchmark, but not with the Below 2 Degrees benchmark, while the Japanese utility Chubu Electric Power will be aligned with the Paris Pledges, but neither with the 2 Degrees nor the Below 2 Degrees benchmarks. E.ON is projected to have the lowest 2020 emissions intensity of all, at just 0.041 tCO_2/MWh,[8] while PPL is projected to have the highest, at 0.832 tCO_2/MWh.

2030 Carbon Performance: in 2030, five companies remain aligned with Below 2 Degrees: E.ON, EDF, Enel, Iberdrola and SSE, all European-headquartered utilities. Six companies are aligned with the Paris Pledges: Chubu Electric Power, Dominion Energy, Duke Energy, Firstenergy, Pinnacle West Capital and XCEL Energy. Five of these utilities are based in the United States. The remaining eight utilities have an emissions intensity of electricity generation above the Paris Pledges benchmark.

2 Degrees versus Below 2 Degrees: the different interpretations of the overall goal of the Paris Agreement, i.e. whether it be 2 Degrees or Below 2 Degrees, do not seem to make a substantial difference to company alignment between now and 2030. Only five companies fall between these scenarios at any point, being aligned with 2 Degrees, but not Below 2 Degrees, and they never do so for more than three consecutive years. There is a larger difference between 2 Degrees and the Paris Pledges and eight companies are aligned with the Paris Pledges, but not with 2 Degrees, at some point between 2014 and 2030.

Regional Carbon Performance

The fact that a majority of utilities assessed in this report had a historical emissions intensity under the global Below 2 Degrees benchmark partly reflects the predominance of US and European utilities in the sample. Indeed, 20 of the 37 utilities we assess on Carbon Performance are based in the USA and nine are based in the EU.

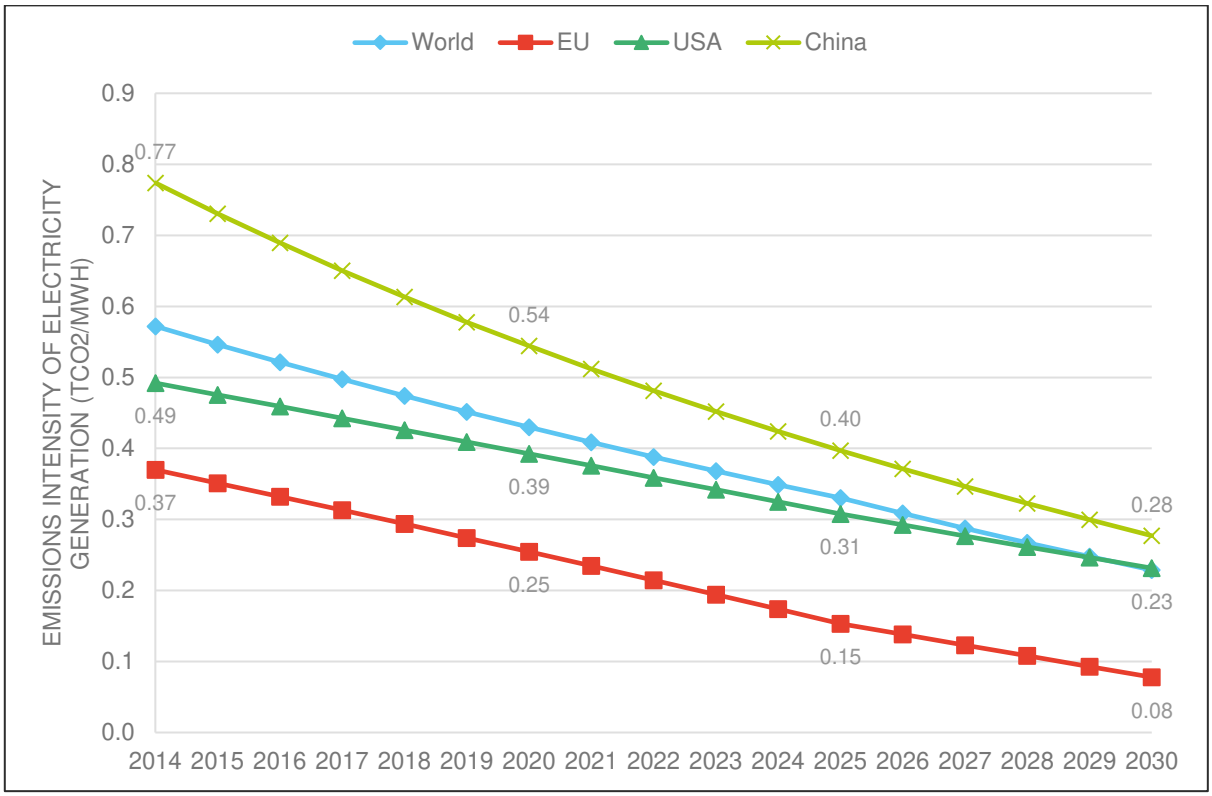
[7] This is calculated as the (unweighted) average of a company's disclosed emissions intensities between 2013 and 2017. Some companies do not disclose data for every year in this period. Some companies are yet to disclose their 2017 emissions intensity. This can be estimated by interpolating between a year prior to 2017 and the company's target year, but we do not include such estimates in the figures reported in this paragraph.

[8] E.ON recently separated its fossil fuel assets into a new company, Uniper, leaving E.ON with renewable power assets only.

The average historical emissions intensity of the utilities listed in the USA is 0.524 tCO_2/MWh, while for the utilities listed in the EU it is just 0.325 tCO_2/MWh.[9] By contrast, according to IEA modelling the average Chinese electricity utility had a corresponding emissions intensity of 0.71 tCO_2/MWh (CLP, the only Chinese utility in our sample providing data, is above that). Therefore the global benchmarks reflect the intensity of power generation everywhere and this intensity is generally higher in emerging markets, whereas our sample of large publicly listed utilities is dominated by companies in industrialised countries that tend – on average though not in all cases – to be less emissions-intensive. Figure shows the difference between the global Below 2 Degrees benchmark and regional Below 2 Degrees benchmarks for the USA, the EU and China (as an example of emerging market emissions). The Below 2 Degrees benchmark for the EU is much lower than its global counterpart, therefore setting a much more exacting test of alignment for any utility generating electricity solely or primarily in Europe. The US Below 2 Degrees benchmark starts lower than its global counterpart, but converges with the global pathway by 2030, reflecting the likely slower pace of decarbonisation taken on by the USA. The Chinese Below 2 Degrees benchmark starts far higher than the global benchmark, but falls rapidly and is catching up with the global pathway as 2030 approaches.

TPI no longer systematically compares the utilities in our sample with these regional benchmarks, because in some cases companies generate electricity in multiple regions and data are not routinely available on the breakdown of electricity generation by region, by company.

Figure 9. Comparison of Below 2 Degrees transition pathways in key regions and globally

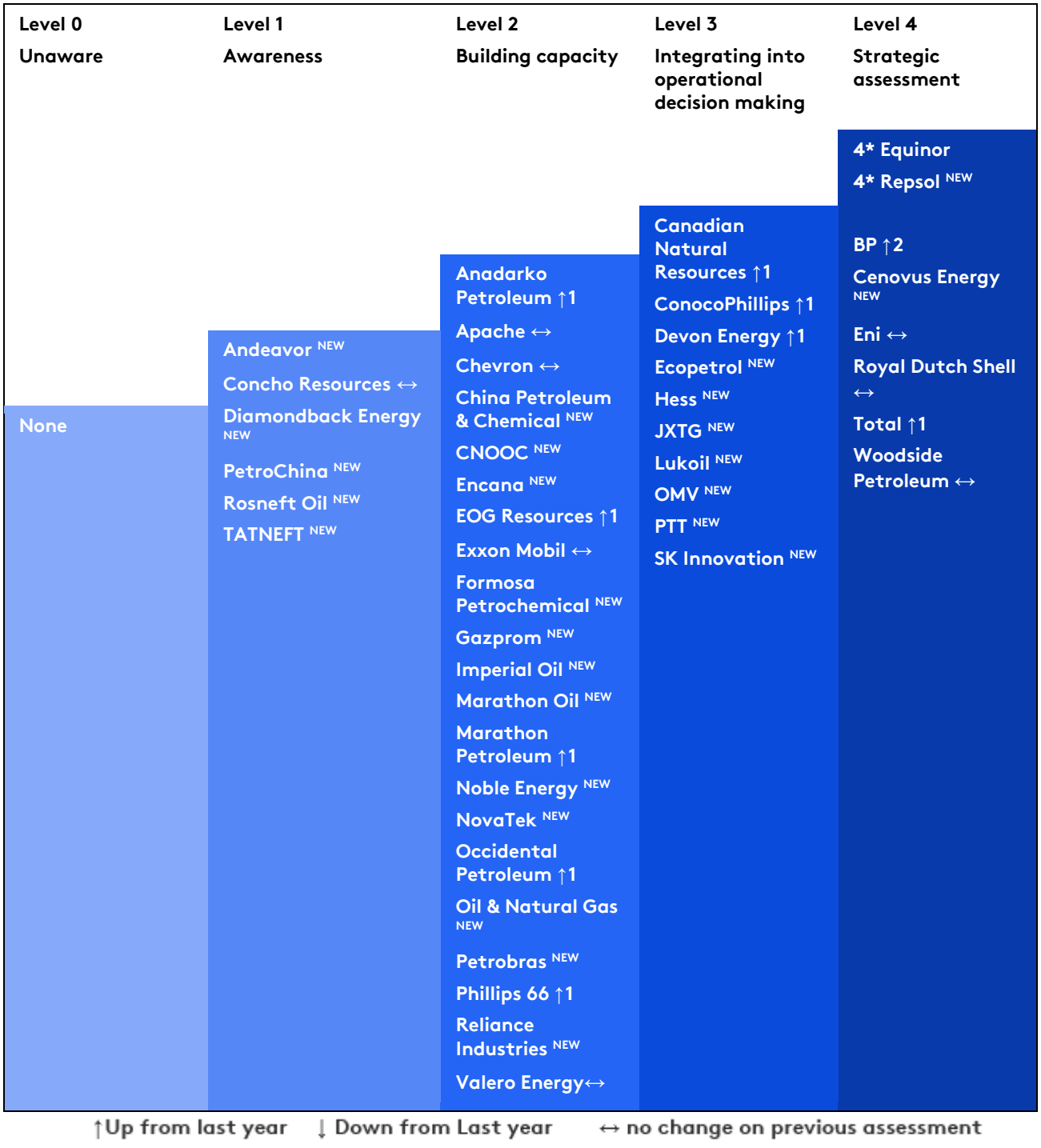


[9] Note that while electricity production is mostly a regional activity and for most companies the country/region of their listing is also where they generate electricity, some companies have assets in multiple regions. Therefore regional data should be interpreted with a degree of caution.

5. Management quality of oil and gas producers

This TPI assessment looks at 45 of the world's largest oil and gas producers, including both integrated producers and specialist exploration/production companies. Companies have been selected primarily on the basis of market capitalisation. These companies usually constitute the largest holdings in investor portfolios. We also include an additional seven smaller companies, which are subject to investor engagement as part of the Climate Action 100+ Initiative. These companies are systemically important for climate change.

Figure 10. Management Quality of 45 large and high-emitting oil and gas producers



Overall results

Figure 10 shows where these companies sit on TPI's Management Quality staircase. The TPI online tool provides a question-by-question assessment of each company.There are no oil and gas producers on Level 0.

Six companies are on Level 1, Acknowledging Climate Change as a Business Issue. Of these, two companies cannot progress, because they do not yet have a policy commitment to action on climate change (Concho Resources and Diamondback Energy). The remaining four companies do not progress, because, although they have a climate change policy in place, they do not demonstrate that they explicitly recognise climate change as a relevant business risk/opportunity. With few exceptions, these six companies also fail to satisfy any criteria on higher levels.

Twenty-one (21) companies are on Level 2 – Building Capacity. One of the pre-requisites for moving on to Level 3 is setting a target to reduce company greenhouse gas emissions. This can be in absolute or relative terms and it can be quantified or unquantified. None of these 21 companies has such a target. The other Level 2 criterion is disclosure of the company's Scope 1 and 2 emissions. This is much more common, but six companies out of the 21 still do not do so (China Petroleum and Chemical, Encana, EOG Resources, Marathon Oil, Phillips 66 and Valero Energy).

Ten companies are on Level 3 – Integrating into Operational Decision Making. These ten companies perform particularly well against the criteria for having their operational emissions data verified and having a process in place to manage climate-related risks. Conversely only four of the ten companies disclose Scope 3 emissions from use of sold products (i.e. downstream combustion of oil and gas), and only three of ten can demonstrate support for domestic and international efforts to mitigate climate change via their membership of business associations and their own stated company position.

Eight companies are on Level 4 – Strategic Assessment. Of these, Eni, Royal Dutch Shell and Woodside Petroleum were also on Level 4 last year, while BP and Total have moved up (see below). Cenovus Energy, Equinor (formerly Statoil) and Repsol are new inclusions in the TPI database.

Equinor and Repsol are 4* companies, satisfying all 17 Management Quality criteria.

The oil and gas sector has an average level score of 2.4, meaning that an average company in this sector would be on Level 2, Building Capacity. Indeed, more oil and gas producers (21 out of 45) are on Level 2 than any other level.

Trends in Management Quality

Last year TPI assessed the world's top 20 oil and gas producers by market capitalisation and found that they had an average level score of 2.0. Eighteen of those 20 companies remain on this year's list. Their average level score has risen to 2.7, which implies that the reason why the sector average has improved since last year is indeed improved Management Quality among the largest producers. The 27 companies with smaller market capitalisation have an average level score of 2.3 this year.

Anadarko Petroleum, EOG Resources, Marathon Petroleum, Occidental Petroleum and Phillips 66 have all moved up from having been on Level 1 last year. This is because they are now able to demonstrate, in relation to criterion/question 2, that they explicitly recognise climate change as a relevant risk/opportunity for the business.[10] In addition, Marathon Petroleum and Phillips 66 have also introduced a policy commitment to action on climate change.

Canadian Natural Resources, ConocoPhillips and Devon Energy have all been promoted from Level 2 to 3. Last year none of these companies had set an emissions target, whereas this year all of them have. In addition, Devon Energy now discloses its operational emissions.

BP has moved up from Level 2 to Level 4 on account of having set a quantitative, long-term emissions target, while Total has moved up one level due to now being able to demonstrate support for domestic and international efforts to mitigate climate change.

[10] Last year the corresponding question was, "Does the company explicitly recognise climate change as a significant issue for the business?" Therefore the reason why these companies are now assessed as Yes on question 2 could be because of a change in company practice, or because of a change in how the indicator is assessed, with the emphasis now on risk/opportunity.

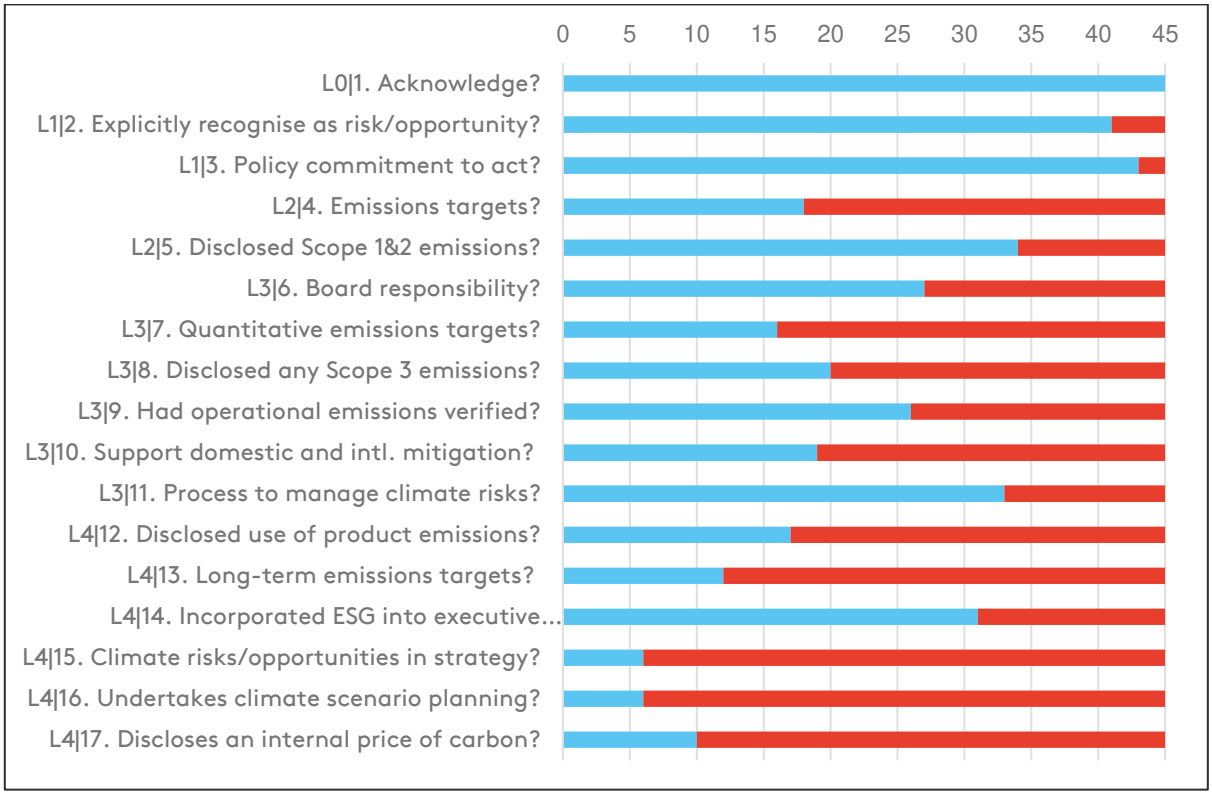
Indicator by indicator

Figure 11 looks at how the 45 oil and gas producers perform against the 17 individual Management Quality criteria. We see the now familiar pattern of companies performing relatively well against the basic questions associated with Levels 0, 1 and 2, but less well against the more demanding questions associated with Levels 3 and 4.

Nearly all oil and gas companies have a policy commitment to act on climate change, as well as explicitly recognising climate change as a relevant business risk/opportunity. In addition, the oil and gas sector is also relatively strong on disclosing operational emissions (and particularly on having these emissions data verified) and on ensuring climate change is a boardroom issue (assigning board responsibility for climate change and incorporating ESG issues into executive remuneration). Many companies also have a process in place to manage climate-related risks.

Performance is weaker on a number of other criteria, notably having an emissions target in place, which is holding back a number of companies from progressing beyond Level 2. It is also important to highlight that only 17 of 45 companies currently disclose emissions from use of sold products, despite the fact that these constitute the majority of lifecycle emissions for oil and gas producers. Like in coal mining and electricity, there is as yet limited adoption of advanced management practices associated with incorporating climate change risks and opportunities into business strategy, undertaking climate scenario planning and disclosing companies' internal carbon price.

Figure 11. Number of oil and gas producers scoring Yes (blue) against individual questions and No (red)



Appendix 1. List of companies covered in this report

Company	Sector	Sub-sector	Country listing	Market cap. (million USD) after investibility weight
Adaro Energy	Mining	Coal	INDO	1738.22
African Rainbow Minerals Ltd	Mining	General Mining	SAF	1105.21
Anglo American	Mining	General Mining	UK	20671.63
Banpu	Mining	Coal	THAI	2602.76
BHP Billiton	Mining	General Mining	UK	42773.71
Bukit Asam	Mining	Coal	INDO	730.68
China Shenhua Energy	Mining	Coal	CHN	8803.71
Coal India	Mining	Coal	IDA	5204.03
DMCI Holdings	Mining	Coal	PHIL	1176.20
Exxaro Resources	Mining	Coal	SAF	3423.12
Glencore	Mining	General Mining	UK	61422.45
Inner Mongolia Yitai Coal	Mining	Coal	CHN	1476.73
Jastrzebska Spolka Weglowa	Mining	Coal	POL	1425.75
Rio Tinto	Mining	General Mining	AU	24446.68
Shougang Fushan Resources	Mining	Coal	HK	767.39
South32	Mining	General Mining	AU	14243.37
Vale	Mining	Iron & Steel	BRAZ	38704.89
Whitehaven Coal	Mining	Coal	AU	2380.19
Yanzhou Coal Mining (H)	Mining	Coal	CHN	2282.30
AGL Energy	Electricity Utilities	Multi-utilities	AU	12475.55
Alliant Energy	Electricity Utilities	Conventional Electricity	USA	9824.85
Ameren	Electricity Utilities	Multi-utilities	USA	14260.82
American Elec Power	Electricity Utilities	Conventional Electricity	USA	36167.91
CenterPoint Energy	Electricity Utilities	Multi-utilities	USA	12197.94
Chubu Electric Power	Electricity Utilities	Conventional Electricity	JA	8681.35
CLP	Electricity Utilities	Conventional Electricity	HK	16778.14
CMS Energy	Electricity Utilities	Conventional Electricity	USA	13179.56
Cons Edison	Electricity Utilities	Conventional Electricity	USA	26335.59

Company	Sector	Sub-sector	Country listing	Market cap. (million USD) after investibility weight
Dominion Energy	Electricity Utilities	Conventional Electricity	USA	51895.40
DTE Energy	Electricity Utilities	Conventional Electricity	USA	19531.48
Duke Energy	Electricity Utilities	Multi-utilities	USA	58830.84
E.ON	Electricity Utilities	Multi-utilities	GER	22394.31
EDF	Electricity Utilities	Conventional Electricity	FRA	5961.15
Edison International	Electricity Utilities	Conventional Electricity	USA	20030.74
Enel	Electricity Utilities	Conventional Electricity	ITA	47856.68
Engie	Electricity Utilities	Multi-utilities	FRA	28297.31
Entergy	Electricity Utilities	Conventional Electricity	USA	14571.88
Eversource Energy	Electricity Utilities	Conventional Electricity	USA	19984.21
Exelon	Electricity Utilities	Conventional Electricity	USA	37741.51
Firstenergy	Electricity Utilities	Conventional Electricity	USA	13559.31
Fortis	Electricity Utilities	Conventional Electricity	CAN	15180.36
Fortum	Electricity Utilities	Conventional Electricity	FIN	8540.19
Iberdrola	Electricity Utilities	Conventional Electricity	SP	43242.27
KEPCO	Electricity Utilities	Conventional Electricity	KOR	9047.83
National Grid	Electricity Utilities	Multi-utilities	UK	40087.84
NextEra Energy	Electricity Utilities	Conventional Electricity	USA	72926.24
Origin Energy	Electricity Utilities	Multi-utilities	AU	12891.34
Orsted	Electricity Utilities	Multi-utilities	DEN	8842.32
PG & E	Electricity Utilities	Conventional Electricity	USA	22878.89
Pinnacle West Capital	Electricity Utilities	Conventional Electricity	USA	9436.49
Power Assets	Electricity Utilities	Conventional Electricity	HK	11006.77
PPL	Electricity Utilities	Conventional Electricity	USA	20994.13
Red Electrica	Electricity Utilities	Conventional Electricity	SP	9675.26

Company	Sector	Sub-sector	Country listing	Market cap. (million USD) after investibility weight
RWE	Electricity Utilities	Multi-utilities	GER	9872.55
Sempra Energy	Electricity Utilities	Multi-utilities	USA	26782.68
Southern Company	Electricity Utilities	Conventional Electricity	USA	47810.82
SSE	Electricity Utilities	Conventional Electricity	UK	18207.97
Tenaga Nasional	Electricity Utilities	Alternative Electricity	MAL	15325.44
WEC Energy Group	Electricity Utilities	Multi-utilities	USA	20924.68
XCEL Energy	Electricity Utilities	Conventional Electricity	USA	24375.35
Anadarko Petroleum	Oil & gas	Exploration & Production	USA	29290.60
Andeavor (formerly Tesoro)	Oil & gas	N/A	USA	17785.64
Apache	Oil & gas	Exploration & Production	USA	16032.50
BP	Oil & gas	Integrated Oil & Gas	UK	136115.39
Canadian Natural Resources	Oil & gas	Exploration & Production	CAN	42438.48
Cenovus Energy	Oil & gas	Exploration & Production	CAN	11240.52
Chevron	Oil & gas	Integrated Oil & Gas	USA	236290.57
China Petroleum & Chemical (H)	Oil & gas	Integrated Oil & Gas	CHN	18701.08
CNOOC (Red Chip)	Oil & gas	Exploration & Production	CHN	22793.79
Concho Resources	Oil & gas	Exploration & Production	USA	22072.97
ConocoPhillips	Oil & gas	Integrated Oil & Gas	USA	65572.57
Devon Energy	Oil & gas	Exploration & Production	USA	21695.94
Diamondback Energy	Oil & gas	Exploration & Production	USA	12338.11
Ecopetrol SA	Oil & gas	Integrated Oil & Gas	COL	3503.94
Encana	Oil & gas	Exploration & Production	CAN	13011.05
Eni	Oil & gas	Integrated Oil & Gas	ITA	41425.49
EOG Resources	Oil & gas	Exploration & Production	USA	62112.85
Equinor	Oil & gas	N/A	NOR	20859.88
Exxon Mobil	Oil & gas	Integrated Oil & Gas	USA	354107.90
Formosa Petrochemical	Oil & gas	Exploration & Production	TWN	5294.47
Gazprom	Oil & gas	Integrated Oil & Gas	RUS	23820.87
Hess	Oil & gas	Integrated Oil & Gas	USA	13396.48
Imperial Oil	Oil & gas	Integrated Oil & Gas	CAN	7967.91

Company	Sector	Sub-sector	Country listing	Market cap. (million USD) after investibility weight
JXTG	Oil & gas	Integrated Oil & Gas	JA	20512.74
Lukoil	Oil & gas	Integrated Oil & Gas	RUS	27005.46
Marathon Oil	Oil & gas	Exploration & Production	USA	14333.31
Marathon Petroleum	Oil & gas	Integrated Oil & Gas	USA	31887.47
Noble Energy	Oil & gas	Exploration & Production	USA	13991.20
NovaTek	Oil & gas	N/A	RUS	12606.88
Occidental Petroleum	Oil & gas	Exploration & Production	USA	56151.11
Oil & Natural Gas	Oil & gas	Exploration & Production	IDA	9419.31
OMV	Oil & gas	Integrated Oil & Gas	OEST	8983.70
Petrobras	Oil & gas	Integrated Oil & Gas	BRAZ	14964.02
Petrochina	Oil & gas	Integrated Oil & Gas	CHN	14506.56
Phillips 66	Oil & gas	Integrated Oil & Gas	USA	44014.05
PTT	Oil & gas	Exploration & Production	THAI	19281.55
Reliance Industries	Oil & gas	Exploration & Production	IDA	44780.13
Repsol	Oil & gas	Integrated Oil & Gas	SP	20987.03
Rosneft Oil	Oil & gas	Integrated Oil & Gas	RUS	5902.78
Royal Dutch Shell	Oil & gas	Integrated Oil & Gas	UK	127086.93
SK Innovation	Oil & gas	Exploration & Production	KOR	11497.08
TATNEFT	Oil & gas	Integrated Oil & Gas	RUS	12432.89
Total	Oil & gas	Integrated Oil & Gas	FRA	121946.92
Valero Energy	Oil & gas	Exploration & Production	USA	40098.70
Woodside Petroleum	Oil & gas	Exploration & Production	AU	21733.05

Appendix 2. TPI Management Quality indicators

Level 0: Unaware of (or Not Acknowledging) Climate Change as a Business Issue	
Question 1	Does the company acknowledge climate change as a significant issue for the business? [If the company does not acknowledge climate change as a significant issue for the business, it is placed on Level 0]
Notes	Companies are assessed as Yes if they: • Explicitly recognise climate change as a relevant risk and/or opportunity for the business (Q2); or • Have a policy or an equivalent statement committing them to take action on climate change (Q3); or • Have set greenhouse gas emission reduction targets (Q4); or • Have published information on their operational greenhouse gas emissions (Q5).
Level 1: Awareness/Acknowledging Climate Change as a Business Issue	
Question 2	Does the company explicitly recognise climate change as a relevant risk and/or opportunity for the business?
Notes	Companies are assessed as Yes if they demonstrate recognition of climate change as a relevant risk and/or opportunity to the business.
Question 3	Does the company have a policy (or equivalent) commitment to action on climate change?
Notes	Companies are assessed as Yes if they have a published policy or commitment statement on climate change that commits them to addressing the issue, or to reducing or avoiding their impact on climate change (e.g. to reduce emissions or improve their energy efficiency).
Level 2: Building Capacity	
Question 4	Has the company set greenhouse gas emission reduction targets?
Notes	Companies are assessed as Yes if they have greenhouse gas emissions reduction targets. These targets may cover Scopes 1, 2 and/or 3, and they may be quantified or unquantified. This question is less demanding than Questions 7 and 13, which require companies to have set quantified targets and for those quantified targets to be long-term, respectively. Companies that are assessed as Yes on Question 7, or Yes on Questions 7 and 13, are automatically assessed as Yes on Question 4.
Question 5	Has the company published information on its operational (Scope 1 and 2) greenhouse gas emissions?
Notes	Companies are assessed as Yes if they report on their Scope 1 and 2, or their Scope 1, 2 and 3 emissions. Companies that only report Scope 1 emissions are assessed as No.

Level 3: Integrating into Operational Decision Making	
Question 6	Has the company nominated a board member or board committee with explicit responsibility for oversight of the climate change policy?
Notes	Companies are assessed as Yes if they provide evidence of clear board or board committee oversight of climate change, or if they have a named individual/position responsible for climate change at board level.
Question 7	Has the company set quantitative targets for reducing its greenhouse gas emissions?
Notes	Companies are assessed as Yes if they have set quantified targets to reduce greenhouse emissions in relative or absolute terms (Scopes 1, 2 and/or 3). This question is more demanding than Question 4, as companies must have set quantitative targets to reduce emissions. This question differs from Question 13, which asks whether companies have set quantified targets for reducing greenhouse gases over the long term (i.e. targets that are more than five years in duration). Companies that are assessed as Yes on Question 13 are automatically assessed as Yes on this question.
Question 8	Does the company report on Scope 3 emissions?
Notes	Companies are assessed as Yes if they report on Scope 3 emissions separately, either in total or in one or more categories, or if they provide a total for Scope 1, 2 and 3 emissions.
Question 9	Has the company had its operational (Scope 1 and/or 2) greenhouse gas emissions data verified?
Notes	Companies are assessed as Yes if their operational greenhouse gas emissions have been independently verified by a third party, or if they state the international assurance standard they have used and the level of assurance.
Question 10	Does the company support domestic and international efforts to mitigate climate change?
Notes	Companies are assessed as Yes if they demonstrate support for mitigating climate change through membership of business associations that are supportive, and if they have a clear company position on public policy and regulation.
Question 11	Does the company have a process to manage climate-related risks?
Notes	Companies are assessed as Yes if they have integrated climate change into multi-disciplinary company-wide risk management, or if they have a specific climate-related risk management process.
Question 12 (applicable to some sectors only)	Does the company disclose materially important Scope 3 emissions?
Notes	Scope 3 emissions are diverse and many companies only disclose in a sub-set of categories. In some sectors, particular categories of Scope 3 emissions are materially important, in the sense of being a large share of lifecycle emissions. In these sectors, we require companies to specifically disclose emissions in the relevant category or categories. For example, in automobile manufacturing, coal mining, and oil and gas production, we ask: does the company disclose Scope 3 emissions from use of sold products?

Level 4: Strategic Assessment	
Question 13	Has the company set long-term quantitative targets for reducing its greenhouse gas emissions?
Notes	Companies are assessed as Yes if they have set quantified, long-term targets (i.e. more than five years in duration) to reduce greenhouse emissions in relative or absolute terms (Scopes 1, 2 and/or 3). This question is more demanding than Question 7, as the targets must not only be quantitative, they must also be long-term.
Question 14	Has the company incorporated environmental, social and governance issues into executive remuneration?
Notes	Companies are assessed as Yes if executive remuneration incorporates environmental, social and governance performance.
Question 15	Does the company incorporate climate change risks and opportunities in their strategy?
Notes	Companies are assessed as Yes if they detail how they incorporate climate change risks and opportunities in their strategy (mitigation, new products, R&D, etc.), and if they disclose the impact of climate change risks and opportunities on financial planning (OPEX, CAPEX, M&A, debt).
Question 16	Does the company undertake climate scenario planning?
Notes	Companies are assessed as Yes if they mention the 2 degrees scenario in relation to business planning or confirm they have conducted climate related scenario analysis, and if they describe the business impact of one or more climate scenario analysis.
Question 17	Does the company disclose an internal price of carbon?
Notes	Companies are assessed as Yes if they have and disclose their internal carbon price.

Appendix 3. Carbon Performance assessment

TPI's Carbon Performance assessment is based on the Sectoral Decarbonization Approach (SDA).[5] The SDA translates greenhouse gas emissions targets made at the international level (e.g. under the Paris Agreement to the UN Framework Convention on Climate Change) into appropriate benchmarks, against which the performance of individual companies can be compared.

The SDA is built on the principle of recognising that different sectors of the economy (e.g. oil and gas production, electricity generation and automobile manufacturing) face different challenges arising from the low-carbon transition, including where emissions are concentrated in the value chain, and how costly it is to reduce emissions. Other approaches to translating international emissions targets into company benchmarks have applied the same decarbonisation pathway to all sectors, regardless of these differences.[6]

Therefore the SDA takes a sector-by-sector approach, comparing companies within each sector against each other and against sector-specific benchmarks, which establish the performance of an average company that is aligned with international emissions targets.

Applying the SDA can be broken down into the following steps:

- A global carbon budget is established, which is consistent with international emissions targets, for example keeping global warming below 2°C. To do this rigorously, some input from a climate model is required.
- The global carbon budget is allocated across time and to different regions and industrial sectors. This typically requires an integrated economy-energy model, and these models usually allocate emissions reductions by region and by sector according to where it is cheapest to reduce emissions and when (i.e. the allocation is cost-effective). Cost-effectiveness is, however, subject to some constraints, such as political and public preferences, and the availability of capital. This step is therefore driven primarily by economic and engineering considerations, but with some awareness of political and social factors.
- In order to compare companies of different sizes, sectoral emissions are normalised by a relevant measure of sectoral activity (e.g. physical production, economic activity). This results in a benchmark path for emissions intensity in each sector:

$$\text{Emissions intensity} = \frac{\text{Emissions}}{\text{Activity}}$$

Assumptions about sectoral activity need to be consistent with the emissions modelled and therefore should be taken from the same economy-energy modelling, where possible.

- Companies' recent and current emissions intensity is calculated and their future emissions intensity can be estimated based on emissions targets they have set (i.e. this assumes companies exactly meet their targets).[11] Together these establish emissions intensity paths for companies.
- Companies' emissions intensity paths are compared with each other and with the relevant sectoral benchmark pathway.

TPI uses the following sectoral benchmark pathways/scenarios:

- A *Paris Pledges* scenario, which is consistent with the global aggregate of emissions reductions pledged by countries as part of the Paris Agreement in the form of Nationally Determined Contributions or NDCs. Several studies have documented that this aggregate is

[11] Alternatively, future emissions intensity could be calculated based on other data provided by companies on their business strategy and capital expenditure plans.

currently insufficient to put the world on a path to limit warming to 2°C, even if it will constitute a departure from a business-as-usual trend.[7]–[9]

- A *2 Degrees* scenario, which is consistent with the overall aim of the Paris Agreement to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels", albeit at the low end of the range of ambition.[10]
- A *Below 2 Degrees* scenario, which is consistent with a more ambitious interpretation of the Paris Agreement's overall aim.

The usual source of data for these scenarios, including in the electricity sector, is the modelling of the International Energy Agency (IEA), via its biennial *Energy Technology Perspectives* report.[11]

In the electricity sector, the specific measure of emissions intensity is *greenhouse gas emissions per unit of electricity produced*, in units of (metric) tonnes of CO_2 equivalent per megawatt hour.

This specifically covers emissions from the electricity generation process. It is sometimes referred to as 'absolute emissions' from electricity production (e.g. in the CDP questionnaire). In most cases, these emissions constitute all or nearly all of the company's Scope 1 emissions, but some companies have significant Scope 1 emissions from other sources and these must be subtracted, or else a stand-alone figure for emissions from electricity generation must be provided.

There are three main reasons for the choice of measure. First, it is consistent with the data provided by the IEA for the benchmark paths, which comprise direct CO_2 emissions from electricity generation,[12] as well as the amount of electricity generated. Second, almost all power-sector emissions are from the generation process. Third, data are relatively widely available for the companies in the TPI sample.

In line with TPI's philosophy, companies' emissions intensity paths are derived from public disclosures (including responses to the annual CDP questionnaire, as well as companies' own reports, e.g. sustainability reports) as far as possible. In particular, only company disclosures are used to estimate recent and current emissions intensity, and company disclosures are also the source of information on targets for future emissions.

Further details of how the Carbon Performance methodology is applied in specific sectors, including electricity, can be found in TPI's occasional Methodology Notes.

[12] IEA only provides an estimate of CO_2 emissions and does not include other greenhouse gases. However, these are typically a very small share of companies' emissions from electricity production (0-3%), so we allow a comparison of company emissions intensity, in terms of all greenhouse gases, with benchmark emissions intensity, in terms of CO_2 only.

Bibliography

[1] S. Dietz, C. Garcia-Manas, W. Irwin, A. Matthews, R. Sullivan, and F. Ward, "Carbon Performance Assessment in Oil and Gas: Discussion Paper," London: TPI 2018.

[2] S. Dietz, C. Garcia-Manas, W. Irwin, B. Rauis, and R. Sullivan, "Methodology and Indicators Report: Version 2.0," London: TPI, 2018.

[3] S. Dietz, E. French, C. Garcia-Manas, and R. Sullivan, "Management Quality of Coal Mining Companies: a Commentary," London: TPI, 2017.

[4] S. Dietz, E. French, and B. Rauis, "Carbon Performance Assessment of Electricity Utilities: a Commentary," London: TPI, 2017.

[5] O. Krabbe *et al.*, "Aligning corporate greenhouse-gas emissions targets with climate goals," *Nat. Clim. Chang.*, vol. 5, pp. 1057–1060, 2015.

[6] J. Randers, "Greenhouse gas emissions per unit of value added ('GEVA'): a corporate guide to voluntary climate action," *Energy Policy*, vol. 48, pp. 46–55, 2012.

[7] UNEP, "The Emissions Gap Report 2015: A UNEP Synthesis Report," Nairobi, 2015.

[8] R. Boyd, J. Cranston Turner, and B. Ward, "Intended nationally determined contributions: what are the implications for greenhouse gas emissions in 2030?," London: Grantham Research Institute on Climate Change and the Environment, 2015.

[9] United Nations, "Adoption of the Paris Agreement," 2015.

[10] UNFCCC, "Paris Agreement," 2015.

[11] International Energy Agency, *Energy Technology Perspectives 2017*. International Energy Agency, 2017.