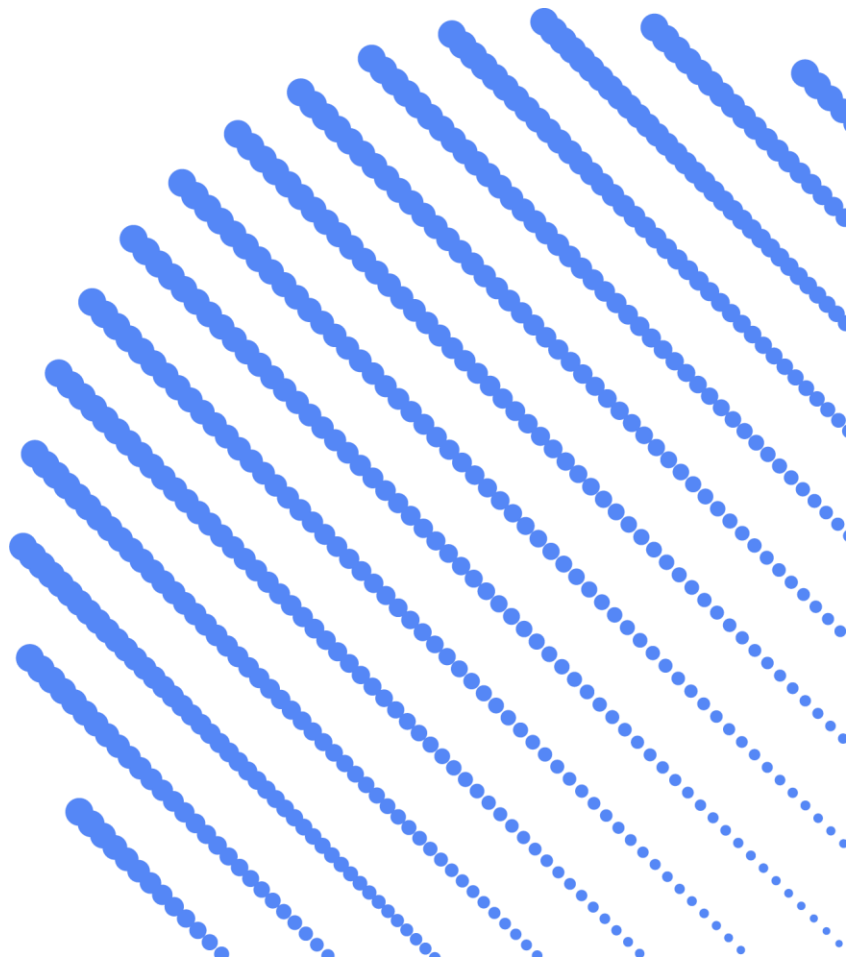




Transition
Pathway
Initiative

Management Quality and Carbon Performance of Industrials and Materials Companies: February 2020

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Jolien Noels and Rory Sullivan



Research Funding Partners



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Key messages

This is TPI's latest assessment of industrials and materials companies, comprising 100 companies in aluminium, cement, chemicals, paper and steel production. We perform a sector-wide assessment of chemical companies' Management Quality for the first time.

On Management Quality, industrials/materials companies are currently halfway between Levels 2 and 3 on average, i.e. transitioning from building capacity to integrating climate change into operational decision making. Paper is currently the worst performing of these sectors on Management Quality. The chemicals sector performs best and outperforms all other TPI sectors.

In aggregate, industrials/materials companies' Management Quality has improved since our previous assessment in mid-2018, but only marginally. 26% of companies for which we have trend data have moved up at least one level, but 14% have moved down at least one level, and most have not moved.

On Carbon Performance, 30% of companies are aligned with the least ambitious Paris Pledges benchmark and 19% are aligned with a path to keep global warming at 2C or below. These shares are similar to the TPI average. Currently paper has the best Carbon Performance in the industrials/materials sector and the second-best Carbon Performance of all TPI sectors. Chemical companies are not included in the Carbon Performance assessment.

Alignment with the Paris goals and pledges has improved compared to our previous assessment. This is driven largely by cement and paper. Emissions disclosure has also improved, particularly by companies listed in Asia (especially China), as well as Russia.

About the Transition Pathway Initiative

About TPI and this slide set

TPI is a global initiative led by Asset Owners and supported by Asset Managers. Established in January 2017, TPI now has over 60 supporters with more than \$18 trillion of combined Assets Under Management and Advice.*

Using publicly disclosed data, TPI assesses the progress companies are making on the transition to a low-carbon economy, supporting efforts to mitigate climate change:

- In line with the recommendations of TCFD;
- Providing data for the Climate Action 100+ initiative.

All TPI data are published via an open-access online tool:

www.transitionpathwayinitiative.org.

This slide set presents our latest assessment of the industrials and materials sector, including aluminium, cement, chemicals, paper and steel producers. This is our first dedicated assessment of chemical companies' Management Quality.

*as of January 2020



TPI strategic relationships

The Grantham Research Institute on Climate Change and the Environment, a research centre at the London School of Economics and Political Science (LSE), is TPI's *academic partner*. It has developed the assessment framework, provides company assessments, and hosts the online tool.

FTSE Russell is TPI's *data partner*. FTSE Russell is a leading global provider of benchmarking, analytics solutions and indices.

The Principles for Responsible Investment (PRI) manages and provides supporter coordination to TPI. PRI is an international network of investors implementing the six Principles for Responsible Investment.



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POLITICAL SCIENCE ■



Grantham
Research Institute
on Climate Change
and the Environment



TPI Governance

TPI Co-Chairs



TPI Steering Committee



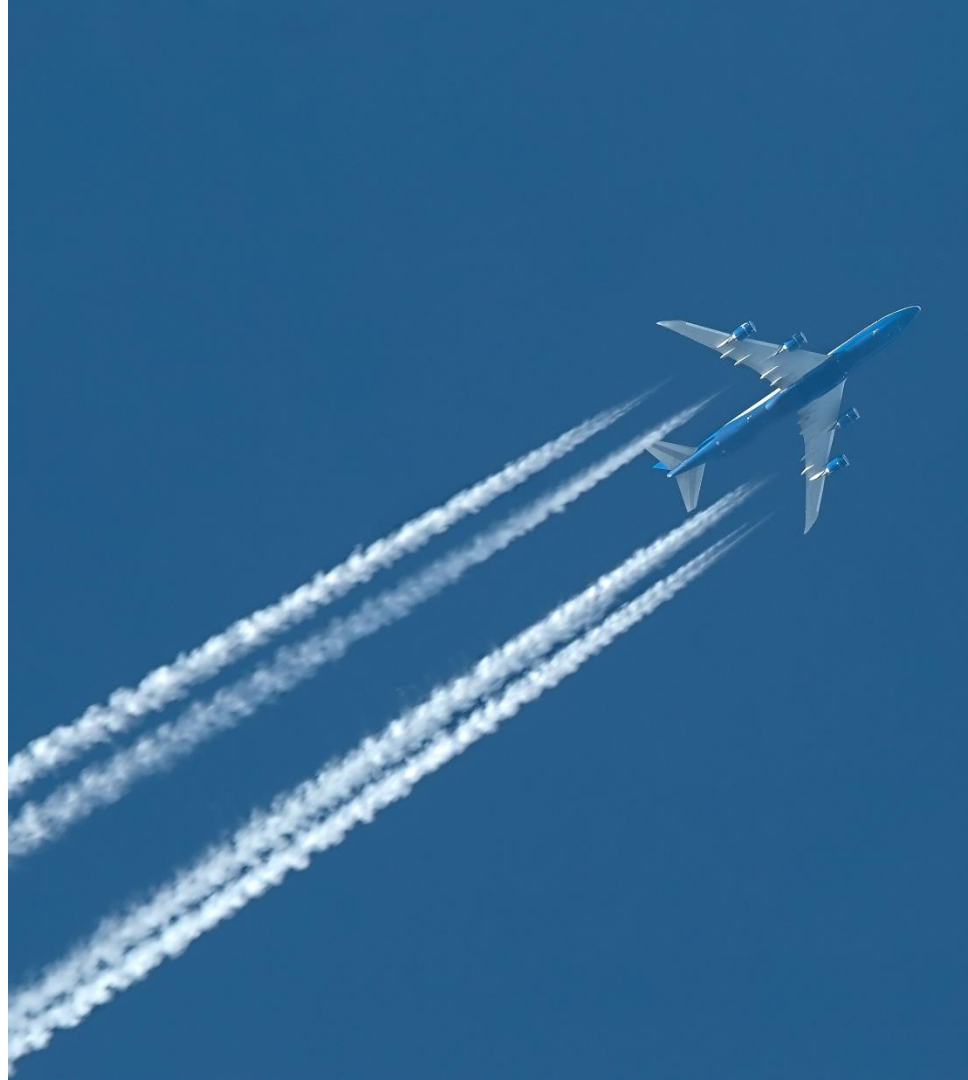
TPI design principles

Disclosure-based: Company assessments are based only on publicly available information

Accessible and easy to use: Outputs are designed to be useful to Asset Owners and Asset Managers, especially with limited resources to assess climate change

Not seeking to add unnecessarily to the reporting burden: Aligned with existing initiatives and disclosure frameworks, such as CDP and TCFD

Corporate level: Pitched at a high level of aggregation



Overview of the TPI Tool

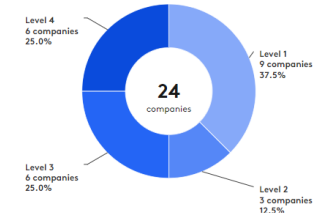
TPI's company assessments are divided into 2 parts:

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.

Both of these assessments are based on company disclosures.

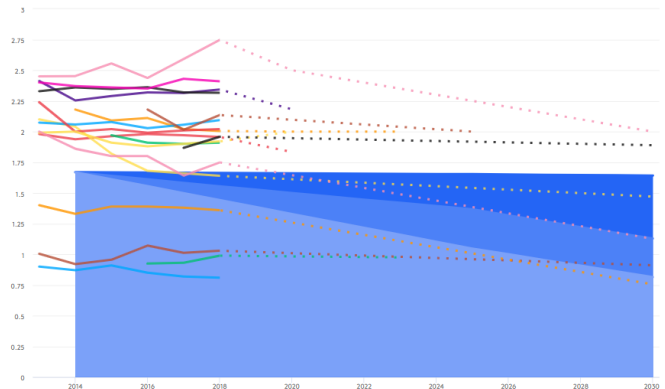
Management Quality: Steel

Distribution of companies in the **Steel** sector according to the management of their greenhouse gas emissions and of risks and opportunities related to the low-carbon transition.



Carbon Performance: Steel

— Reported - - - - Targeted
Carbon intensity (tonnes of CO₂ per tonne of steel)



Management Quality

Level 0	Level 1	Level 2	Level 3	Level 4
Unaware	Awareness	Building capacity	Integrating into operational decision making	Strategic assessment

TPI's Management Quality framework is based on 19 indicators, each of which tests whether a company has implemented a particular carbon management practice. These 19 indicators are used to map companies on to 5 levels/steps. The data are provided by FTSE Russell. See our latest *Methodology and Indicators Report, version 3.0*, for more detail.

Company does not recognise climate change as a significant issue for the business

Company recognises climate change as a relevant risk/opportunity for the business

Company has a policy (or equivalent) commitment to action on climate change

Company has set GHG emission reduction targets

Company has published info. on its operational GHG emissions

Company has nominated a board member/committee with explicit responsibility for oversight of the climate change policy

Company has set quantitative targets for reducing its GHG emissions

Company reports on its Scope 3 GHG emissions

Company has had its operational GHG emissions data verified

Company supports domestic & international efforts to mitigate climate change

Company discloses membership and involvement in trade associations engaged on climate (*new question*)

Company has a process to manage climate-related risks

Company discloses Scope 3 GHG emissions from use of sold products (selected sectors only)

Company has set long-term quantitative targets (>5 years) for reducing its GHG emissions

Company has incorporated climate change performance into executive remuneration (*modified question*)

Company has incorporated climate change risks and opportunities in its strategy

Company undertakes climate scenario planning

Company discloses an internal carbon price

Company ensures consistency between its climate change policy and position of trade associations of which it is a member (*new question*)

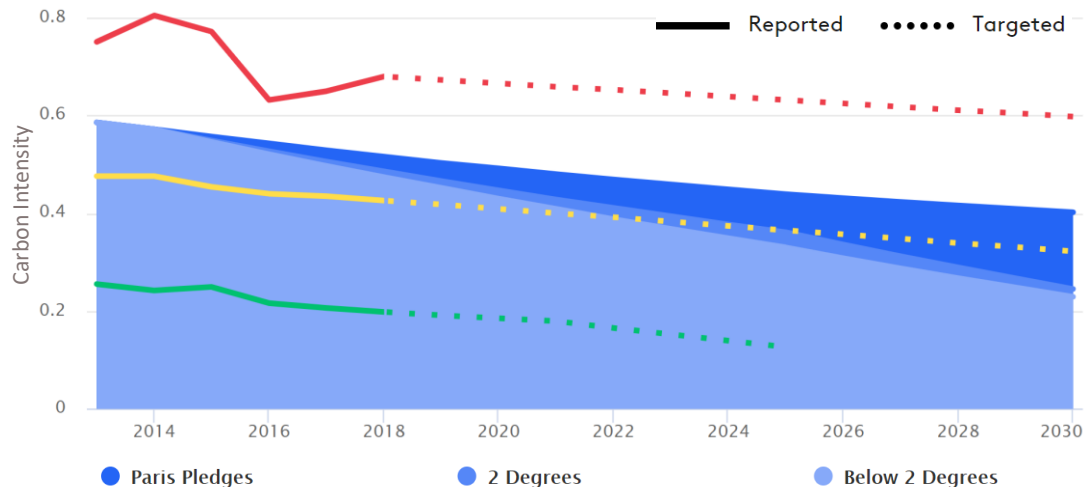
Carbon Performance

TPI's Carbon Performance assessment tests the alignment of company targets with the UN Paris Agreement goals.*

We use 3 benchmark scenarios for each sector, which in the industrials/materials sector are:

1. *Paris Pledges*, consistent with emissions reductions pledged by countries as part of the Paris Agreement (i.e. NDCs; note these are insufficient to limit global warming to 2C or below);
2. *2 Degrees*, consistent with the overall aim of the Paris Agreement, albeit at the low end of the range of ambition (at least a 50% chance of limiting warming to 2°C);
3. *Below 2 Degrees*, consistent with a more ambitious interpretation of the Paris Agreement's overall aim (50% chance of limiting warming to 1.75°C).

Benchmarking is sector-specific and based on emissions intensity (e.g. grams of CO₂ per tonne of crude steel). See TPI website for further details.



Company A is not aligned with any of the benchmarks

Company B is eventually aligned with the Paris Pledges, but neither 2C/ nor Below 2C

Company C is aligned with all Paris benchmarks, including Below 2C

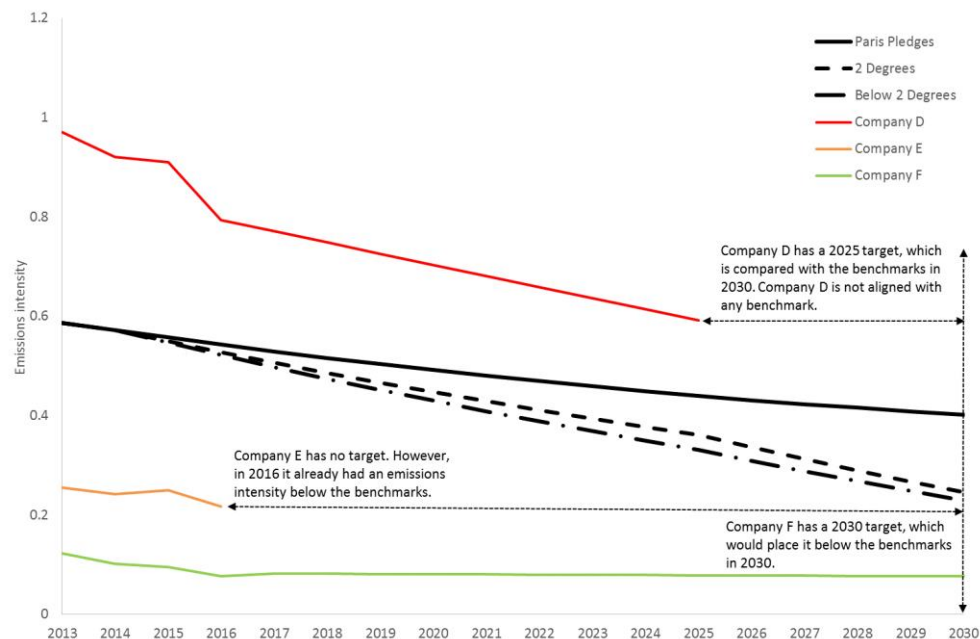
*We use the Sectoral Decarbonization approach (SDA), which was created by CDP, WWF & WRI in 2015 & is also used by the Science Based Targets Initiative.

Reducing TPI's Carbon Performance data to a single indicator of alignment with Paris

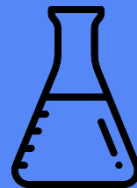
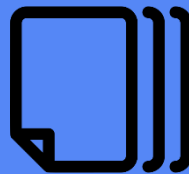
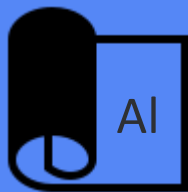
Our Carbon Performance data cover multiple years. How can they be used to answer the simple question: is a company aligned with the Paris goals?

To do this we compare a company's emissions intensity in the last year for which we have data with the benchmarks at the end of the horizon, which is 2030 for the industrials/materials sectors we assess. Thus, for example:

- Company with a 2030 emissions reduction target – the company's expected 2030 emissions intensity is compared with the benchmark emissions intensities in 2030;
- Company with no emissions reduction target – the company's historical emissions intensity is compared with the benchmark emissions intensities in 2030 (i.e. a comparison of where the company is now with where it would need to be in 2030).



The state of transition in the industrials/materials sector: overview of results



TPI coverage of industrials/materials

This latest TPI report covers 100 of the world's largest and highest-emitting public companies in industrials/materials. They are grouped into five sectors: aluminium, cement, chemicals, paper and steel.

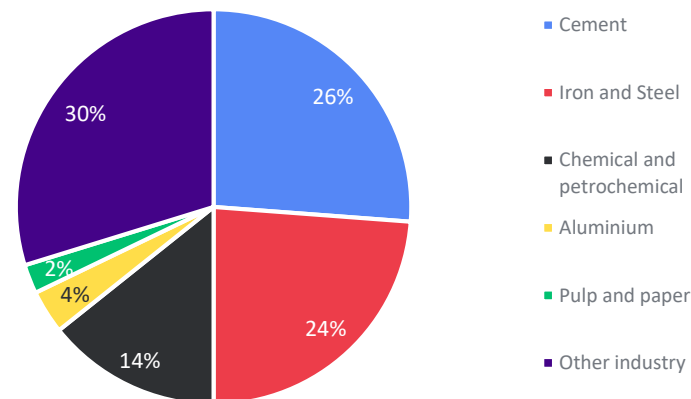
Four of these sectors, aluminium, cement, paper and steel, have been assessed by TPI previously, allowing us to track companies' progress.

For the first time, we assess the Management Quality of the chemical sector, covering 21 companies involved in commodity and speciality chemicals. We cannot yet provide an assessment of chemical companies' Carbon Performance, due to data and methodological challenges in the sector. Our Carbon Performance assessment of aluminium only includes the eight companies involved in both alumina refining and aluminium smelting.

Together, the direct CO₂ emissions from aluminium, cement, chemicals, paper and steel production make up over 2/3 of direct industrial CO₂ emissions (see chart opposite).

Sector	Companies assessed on Management Quality	Companies assessed on Carbon Performance
Aluminium	15	8
Cement	22	22
Chemicals	21	0
Paper	18	18
Steel	24	24
Total	100	72

Direct emissions from industry, 2017



Source: IEA's Tracking Clean Energy Progress, 2019

Management Quality level

Level 0

Unaware

3 Companies: 3%

1 Aluminium

2 Paper

Level 1

Awareness

25 Companies: 25%

3 Aluminium

7 Cement

2 Chemicals

4 Paper

9 Steel

Level 2

Building capacity

16 Companies: 16%

2 Aluminium

5 Cement

2 Chemicals

4 Paper

3 Steel

Level 3

Integrating into operational decision making

30 Companies: 30%

5 Aluminium

5 Cement

10 Chemicals

4 Paper

6 Steel

Level 4

Strategic assessment

26 Companies: 26%

4 Aluminium

5 Cement

7 Chemicals

4 Paper (including one 4*)

6 Steel

Management Quality level

Industrials/materials companies' average Management Quality score is now 2.5, meaning the average company is exactly halfway between Levels 2 and 3. Reaching Level 3 requires both disclosure of operational GHG emissions and setting emissions reduction targets, so the average company is at the stage of putting both of these in place.

Within industrials/materials, the various sectors are quite closely matched: paper companies average 2.2, cement and steel companies both average 2.4, and aluminium companies average 2.5. Chemicals, the newest addition to TPI's database, enters with a high average of 3.0, making it the best performing of TPI's main sectors on Management Quality.

Only one company, UK paper company Mondi, satisfies all Management Quality criteria, earning it a 4* rating. It has become significantly harder to achieve a 4* rating, due to the inclusion of challenging new and modified questions about lobbying and executive remuneration respectively. See slide 11 and our latest *Methodology and Indicators Report, version 3.0*, for more detail.

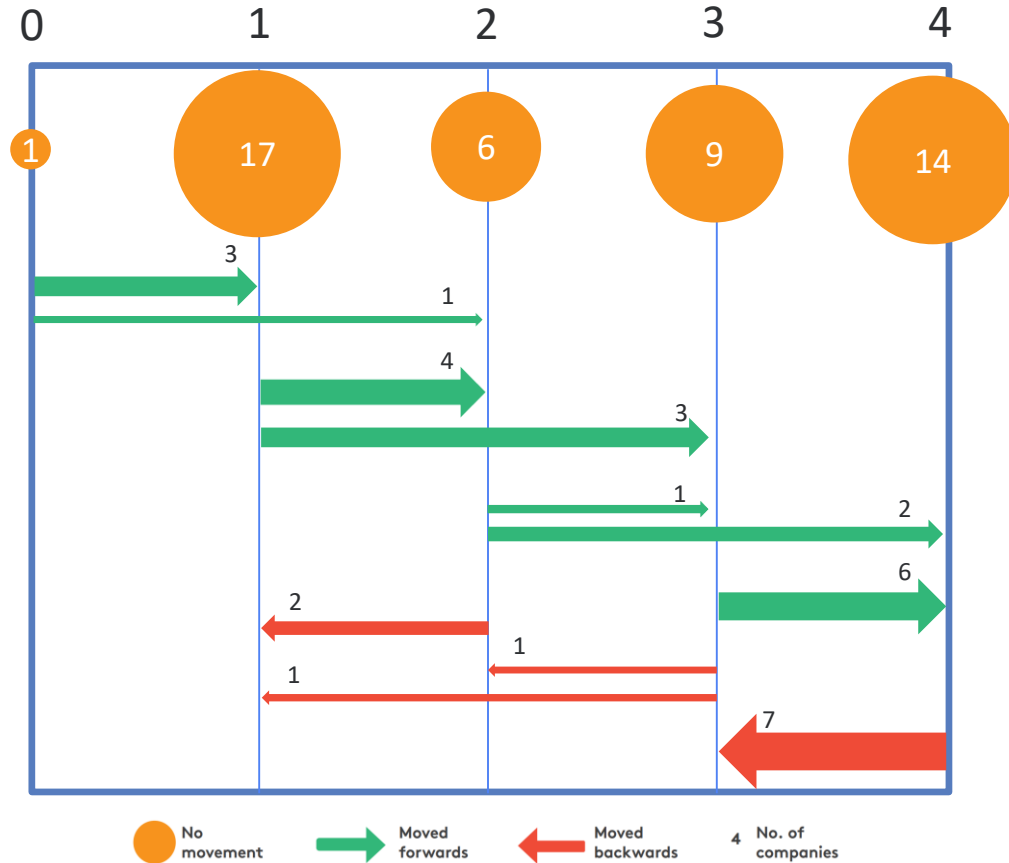


Trends in Management Quality

We have trend data on 78 companies in aluminium, cement, paper and steel, which have now been assessed by TPI at least twice. We find that:

- 47 companies (60%) stayed on the same level as their previous assessment;
- 20 companies (26%) moved up at least one level;
- 11 companies (14%) moved down at least one level. Four of these drops are due to companies failing to satisfy our new indicator on disclosing membership and involvement in trade associations engaged on climate.

As a consequence, the average Management Quality score of cement and paper companies has increased by 0.1 points. In steel, the average score has increased significantly, by 0.4 points. The average score in aluminium has actually fallen by 0.2 points, entirely due to the addition of new companies that perform worse than the sector average.

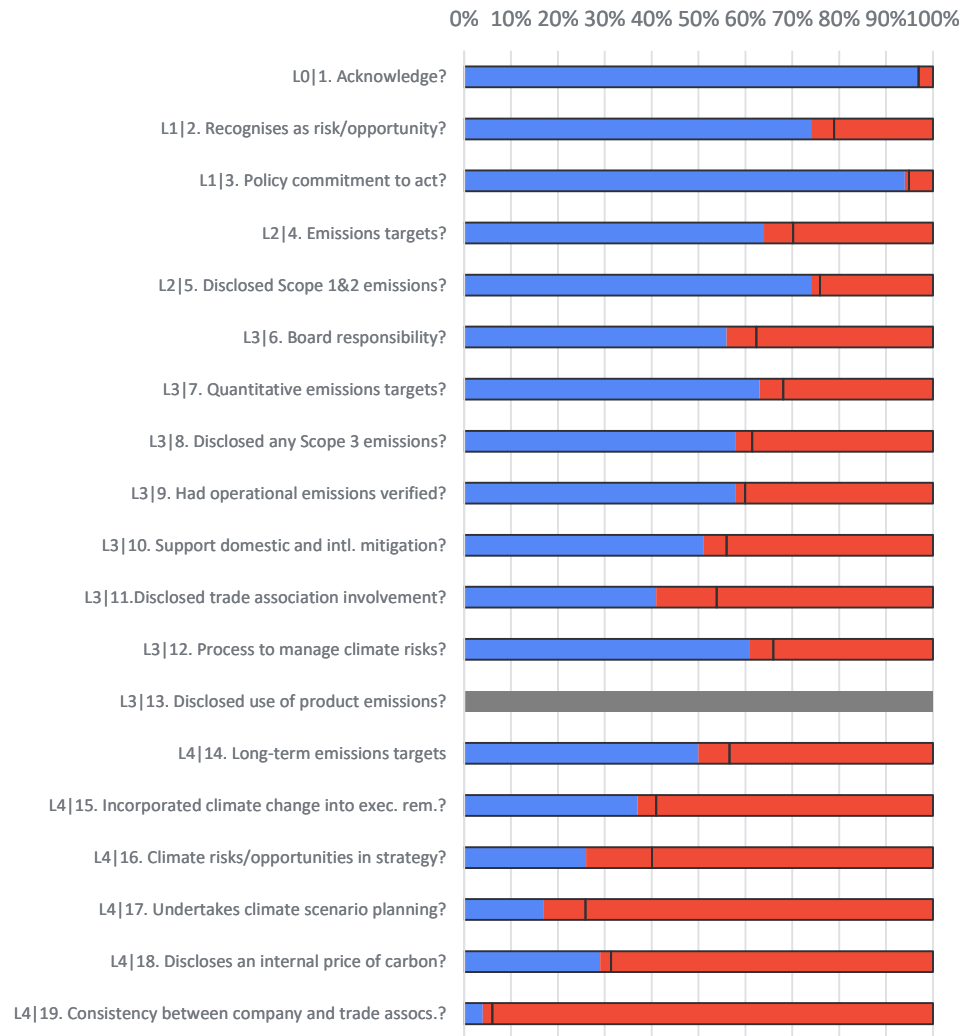


Management Quality: indicator by indicator

Most industrials/materials companies implement the basic carbon management practices, with fewer taking the more advanced steps. We see this general pattern in all TPI sectors.

Compared with the TPI database as a whole, the industrials/materials sector underperforms on all indicators, albeit mostly to a small extent. However, it performs notably worse than average on disclosing membership and involvement in trade associations engaged on climate (Q11), and incorporating climate risks and opportunities in company strategy (Q16).

Only four companies ensure consistency between their climate change policy and the positions taken by those trade associations of which they are a member (Q19).



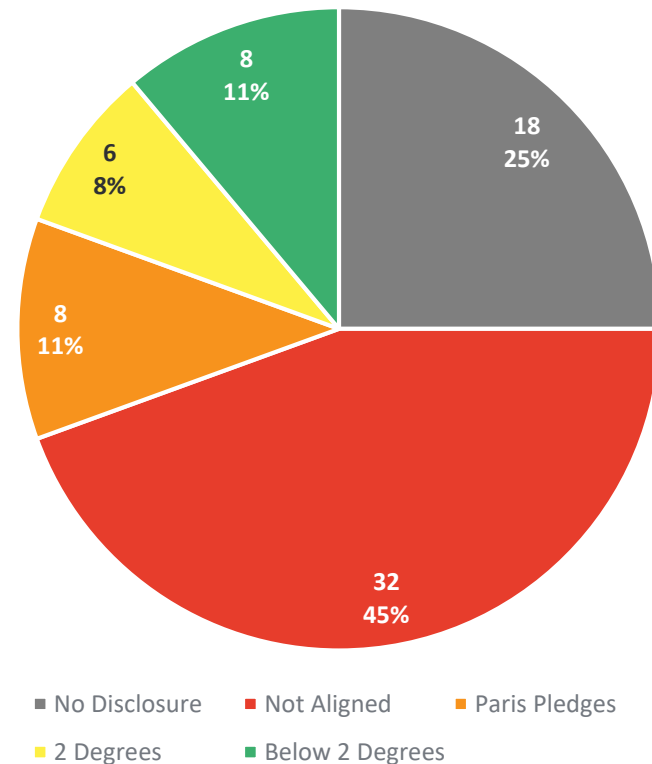
Carbon Performance: alignment with the Paris Agreement benchmarks

This Carbon Performance assessment includes 72 companies in the aluminium, cement, paper and steel sectors. Disclosure limitations and methodological challenges currently prevent Carbon Performance assessment of chemicals.

30% of industrials/materials companies are aligned with the Paris Pledges, or better. This is an improvement on our previous assessment of industrials/materials in mid-2018, when 24% were aligned. The advance is largely driven by the cement and paper sectors.

In our previous assessment, only five industrials/materials companies (7%) had set a 2030 emissions reduction target that was aligned with at least the Paris Pledges. Now 14 companies (19%) have done so.

The proportion of companies disclosing emissions in the industrials/materials sector has increased from 61% in our previous assessment to 75% here. Much of the improvement comes from companies listed in Asia (especially in China), as well as Russia.



Carbon Performance: sector breakdown

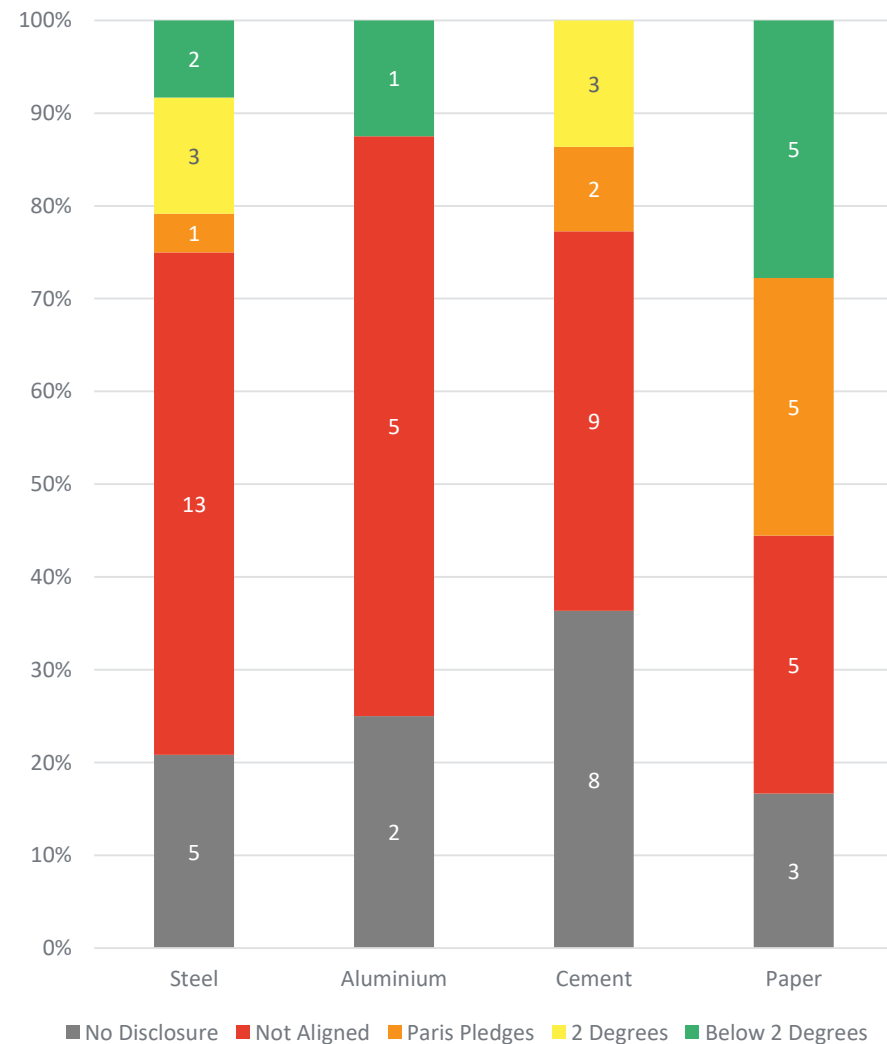
Paper has the strongest Carbon Performance in the industrials/materials sector and it is the second-best performing sector in the TPI database. Over half of the paper companies assessed are projected to be aligned with the Paris Pledges by 2030 and 28% with Below 2C.

By contrast, aluminium, cement and steel companies are less likely to be aligned than the average TPI company. This was also the case last year.

Steel has not improved its Carbon Performance compared to our previous assessment of the sector. However, both disclosure of emissions and target setting have improved in steel.

Although the number of cement producers aligned with the Paris Pledges has more than doubled, the sector still lags behind in terms of both alignment and disclosure. Those companies that are Paris-aligned do so due to their 2030 targets, rather than their current emissions intensities.

Aluminium remains one of the worst performing sectors on Carbon Performance. Only one aluminium company, Norsk Hydro, is expected to be aligned with the Paris Agreement (Below 2C).



Sector focus: steel makers



Key messages – steel makers

The steel sector's Management Quality has improved significantly over the past few years, from a low base. In our first assessment of mid-2017, steel's average score was only 1.8, while now it is 2.4. Just under 40% of steel makers, for which we have trend data, have moved up at least one level relative to our previous assessment. Nonetheless steel sector Management Quality remains below the TPI average.

Steel is also relatively weak on Carbon Performance. Only one in four steel makers will be aligned with the Paris Pledges benchmark in 2030. Of those, only SSAB and Tenaris will be aligned with the Below 2C benchmark. Alignment in the sector has not improved compared to our previous assessment.

However, target setting in the sector has improved. Whereas in our previous assessment no steel company had a target beyond 2020, now six steel makers have an emissions reduction target extending to 2030 or beyond, of which four are aligned with at least the Paris Pledges.

Moreover, disclosure in the sector has also improved, with four companies that were not previously assessable on Carbon Performance included for the first time this year. All four of these companies also moved up at least one Management Quality level.

Companies with a higher Management Quality score are not necessarily more likely to be aligned on Carbon Performance. For example, Voestalpine and JSW Steel both moved up to Level 4, but set a 2030 target that is not Paris-aligned.

Management Quality level

Companies' Management Quality ratings may not always reflect their most up-to-date disclosures. TPI updates its assessments once a year.

Level 0

Unaware

0 Companies: 0%

Level 1

Awareness

9 Companies: 38%

Erdemir
Evraz
Kobe Steel
Nisshin Steel
Novolipetsk Steel
Nucor
Steel Dynamics
Tenaris
United States Steel

Level 2

Building capacity

3 Companies: 13%

Bluescope Steel
Gerdau
Severstal

Level 3

Integrating into
operational decision
making

6 Companies: 25%

Acerinox
China Steel
Hyundai Steel
JFE Holdings
Nippon Steel
Tata Steel

Level 4

Strategic assessment

6 Companies: 25%

Arcelor Mittal
JSW Steel
Posco
SSAB
ThyssenKrupp
Voestalpine



Management Quality level

Our assessment of the steel sector includes the world's 23 largest steel makers by market capitalisation, as well as a further CA100+ company (SSAB).

The average Management Quality score of the sector is 2.4, which makes it the second best-performing industrials/materials sector, after chemicals (1st) and level with cement.

This stands in stark contrast to the historical performance of the steel sector. In our State of Transition report from mid-2019, steel was still the worst performing sector on Management Quality, with a score of below 2 (1.96). Even so, steel remains below the current TPI-wide average of 2.7.

50% of steel companies are now on Levels 3 or 4. There is a clear divide between leaders and laggards, with 9 companies still on Level 1. There are no 4* companies.



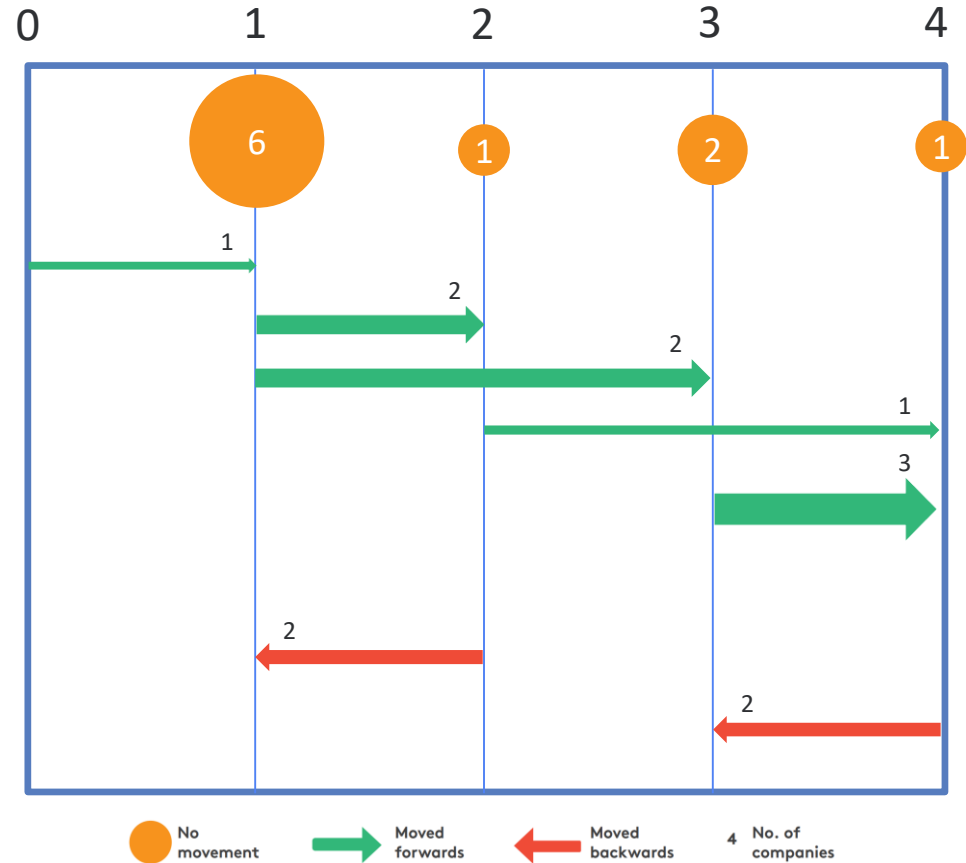
Trends in Management Quality

Of the 23 steel companies for which we have trend data, 10 remain at the same level as our previous assessment, while nine have progressed at least one level.

There are no longer any Level 0 companies, because Novolipetsk Steel has acknowledged climate change as a significant issue for its business for the first time.

Three companies have jumped two levels: Nippon Steel and JFE Steel go from Level 1 to 3, while Voestalpine goes from Level 2 to 4. Voestalpine has improved on no fewer than 11 indicators and is now only two indicators short of Level 4*.

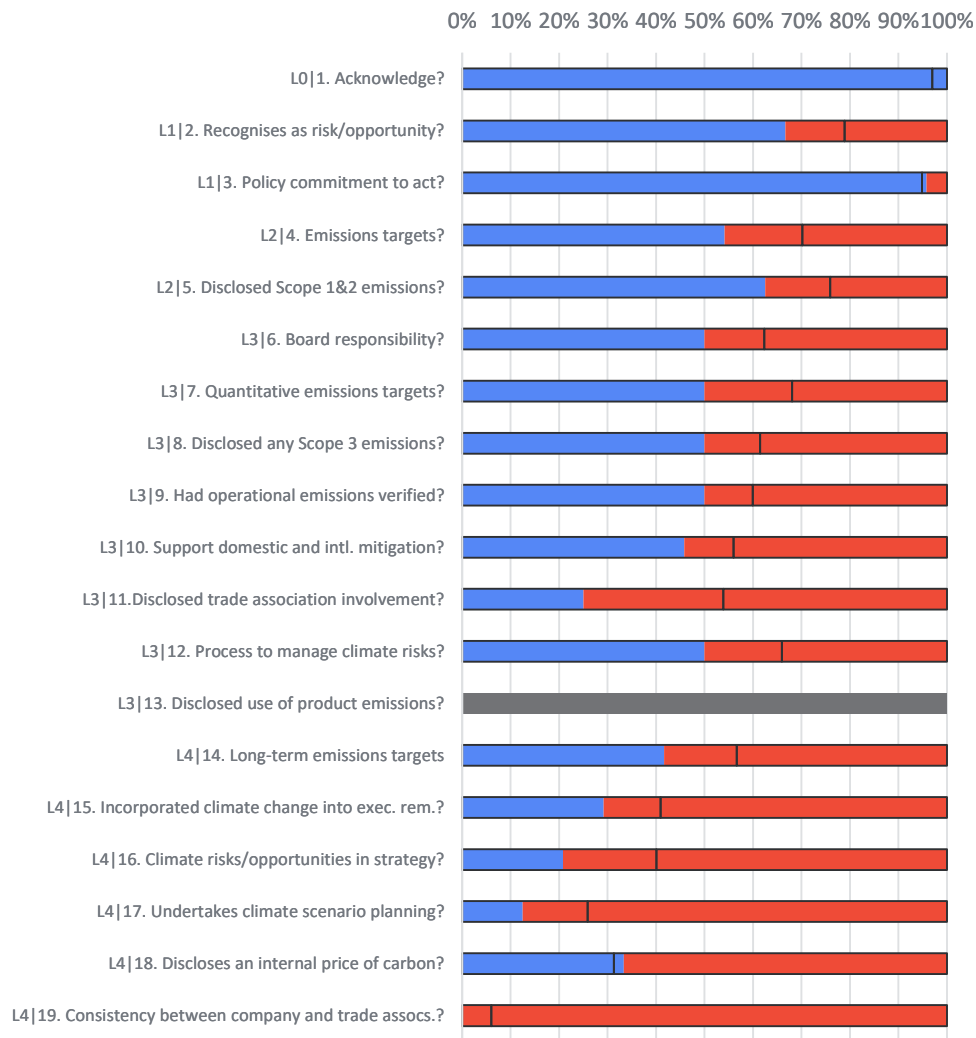
Four companies (Hyundai Steel, Nucor, Tata and US Steel) have moved down a level. Hyundai Steel and Tata move down in part because they do not disclose their involvement in trade associations engaged on climate.



Management Quality: indicator by indicator

Steel makers underperform the average TPI company on most indicators. They perform considerably worse than average on transparency about climate lobbying, with only 25% of companies disclosing their membership and involvement in trade associations engaged on climate issues (Q11).

One notable exception is disclosing an internal price of carbon (Q18), where steel makers perform better than average. Four of the companies for which we have trend data introduced an internal price of carbon last year: Hyundai Steel, Thyssenkrupp, US Steel and Voestalpine.

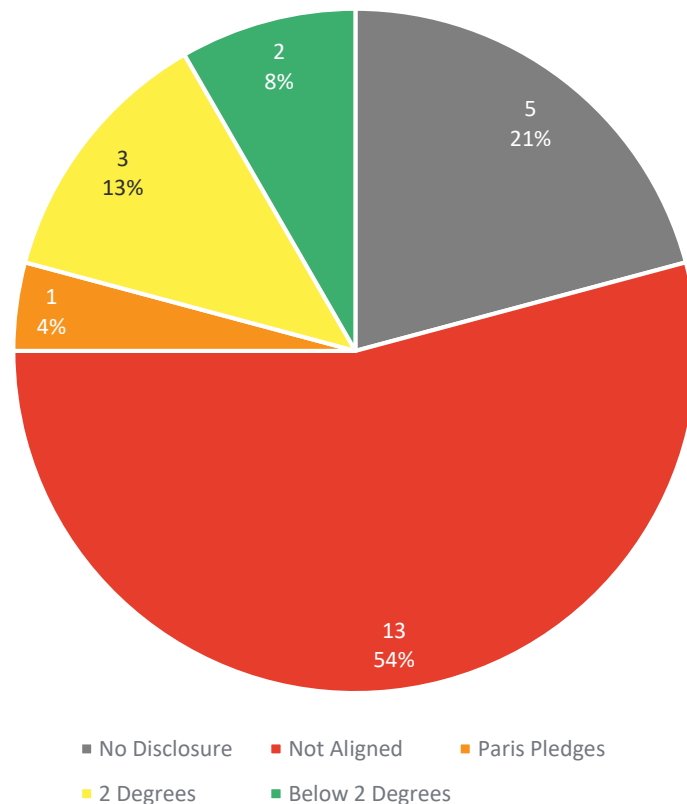


Carbon Performance: alignment with the Paris Agreement benchmarks

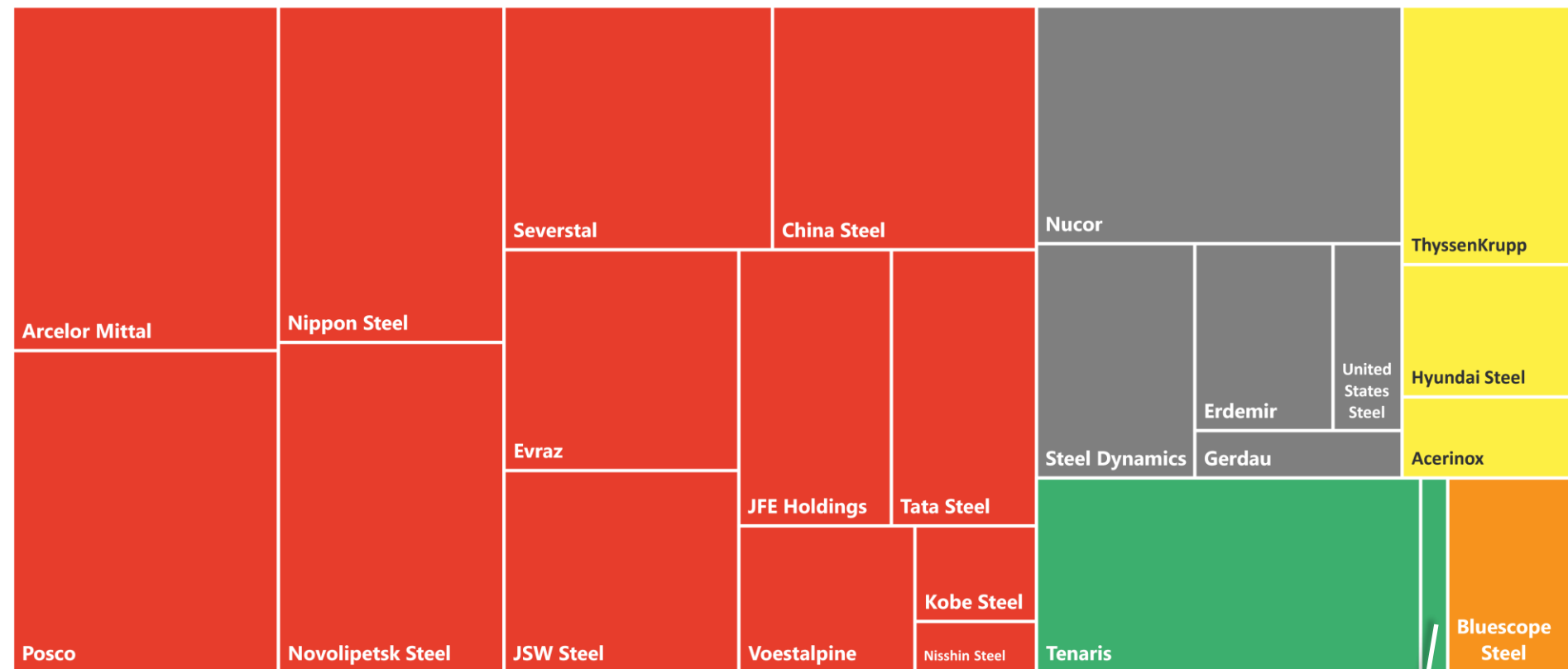
Disclosure in the steel sector is improving; historical Carbon Performance can now be calculated for 79% of steel makers (compared to 65% in our previous assessment). Alignment in the sector has not improved, but the sector has become more forward-looking over the past year.

One in four steel makers is aligned with the Paris Pledges benchmark in 2030. This is similar to our previous assessment. Two companies are aligned with a Below 2C scenario: SSAB and Tenaris. Three more companies are aligned with 2C in 2030: Acerinox, Hyundai Steel and Thyssenkrupp. BlueScope Steel is aligned with the Paris Pledges. Companies with the best Carbon Performance have set more ambitious emissions targets and make more use of electric arc furnaces, recycling and renewable energy.

In our previous assessment, no steel maker had a company-wide, quantitative emissions target beyond 2020. Now 50% have a target for 2020 or beyond. Moreover, six companies have set a target for 2030 or beyond.



Alignment of steel makers, scaled by market cap.



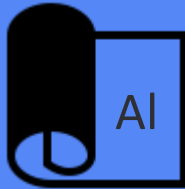
Source for market capitalisation: FTSE Russell (31/12/2019), average of last 4 quarters (before investibility weight)

■ No Disclosure ■ Not Aligned ■ Paris Pledges ■ 2 Degrees ■ Below 2 Degrees

SSAB



Sector focus: Aluminium producers



Key messages – aluminium

The aluminium sector performs above average on Management Quality relative to the industrials/materials sector as a whole, but slightly below average compared to the entire TPI database. 60% of aluminium companies are now on Levels 3 or 4.

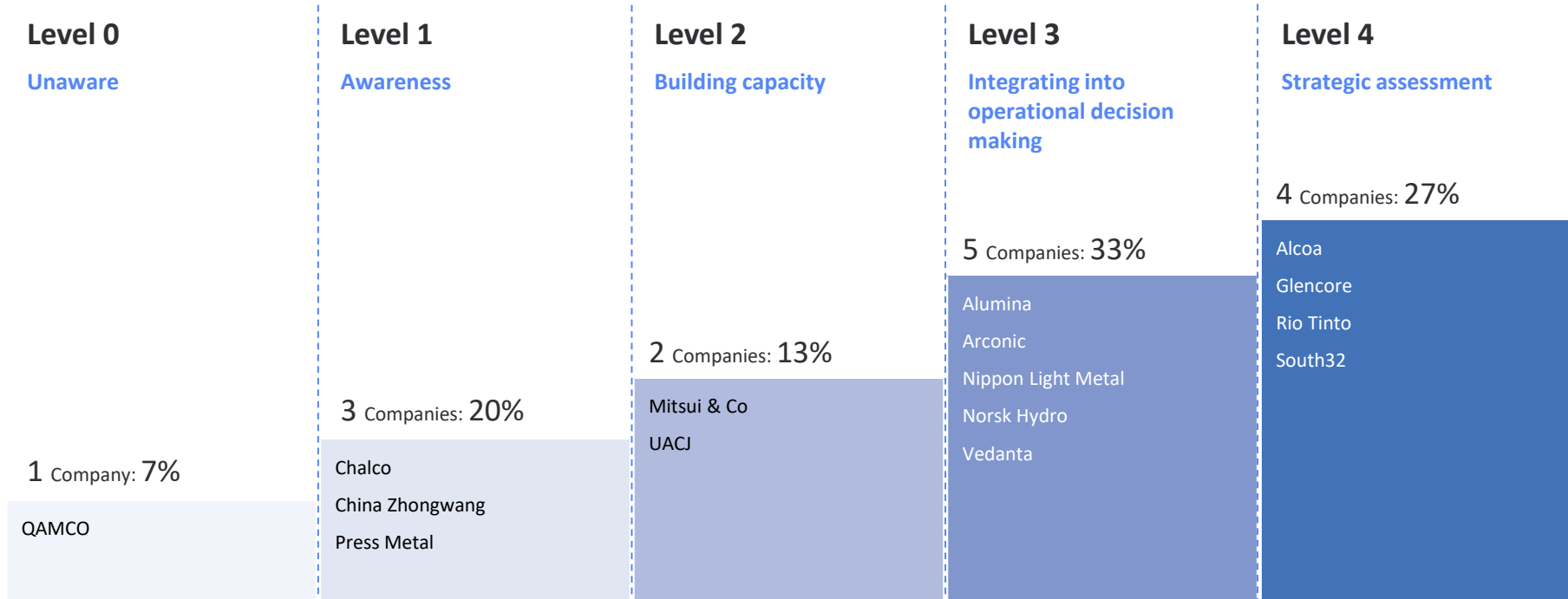
Unusually, among aluminium companies for which we have trend data there has been no movement at all on Management Quality: all companies are on the same level as last year. However, the sector's average score has fallen from 2.8 to 2.5 due to the inclusion of new companies, which happen to perform relatively poorly.

On Carbon Performance, we can calculate an emissions intensity for six aluminium companies (see slide 37). Only companies that are involved in both alumina refining and aluminium smelting fit the TPI methodology, which results in excluding seven companies. Two further companies provide inadequate emissions disclosure.

Carbon Performance varies widely between companies. This can be explained to a large extent by the source of electricity that companies use for smelting aluminium, i.e. fossil or renewable. Only half of the companies assessed on Carbon Performance have aluminium-specific targets to 2030 and only one of them (Norsk Hydro) is aligned with at least one of the benchmarks in 2030 (Below 2C).

Management Quality level

Companies' Management Quality ratings may not always reflect their most up-to-date disclosures. TPI updates its assessments once a year.



Management Quality level

Our assessment of this sector includes the world's 15 largest aluminium companies by market capitalisation.

We no longer assess Russian aluminium company UC Rusal*, but have added three companies: Glencore, Mitsui & Co, and QAMCO.

The average Management Quality score is 2.5, which is down from 2.8 last year. The drop is caused by the new additions Mitsui & Co, and QAMCO. As a result, aluminium is above the industrials/materials average, but is now below the TPI-wide average of 2.7.

More than half of companies are now on Levels 3 or 4, but there are no 4* companies.

There have been no changes in company levels compared to last year.

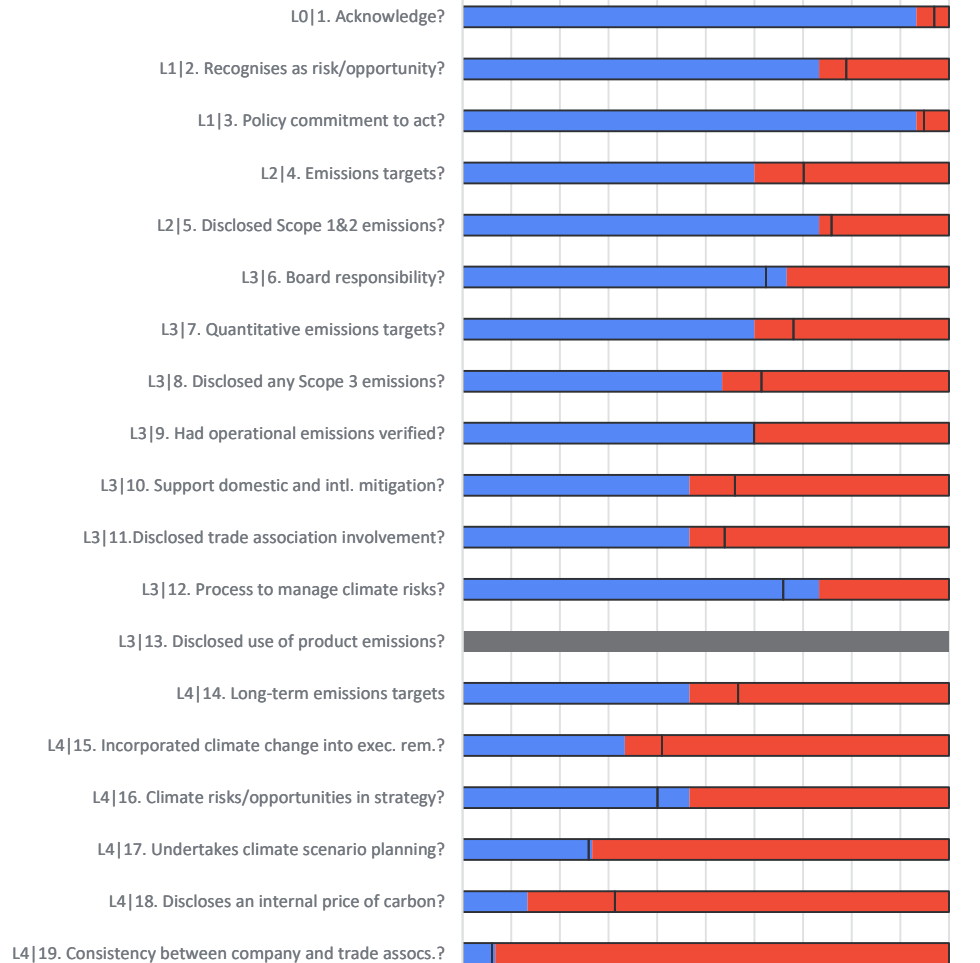
*UC Rusal is not researched by FTSE Russell.



Management Quality: indicator by indicator

Aluminium companies perform better than average on some governance and strategy indicators, including: nominating a board member or board committee with explicit responsibility for oversight of the companies' climate change policy (Q6), having processes in place to manage climate-related risks (Q12), incorporating climate risks and/or opportunities into strategy (Q16), and undertaking climate scenario planning (Q17).

Despite this, aluminium companies generally underperform compared to the average TPI company, particularly on setting quantitative emissions targets (especially long-term targets; Q14), and disclosing an internal price of carbon (Q18).



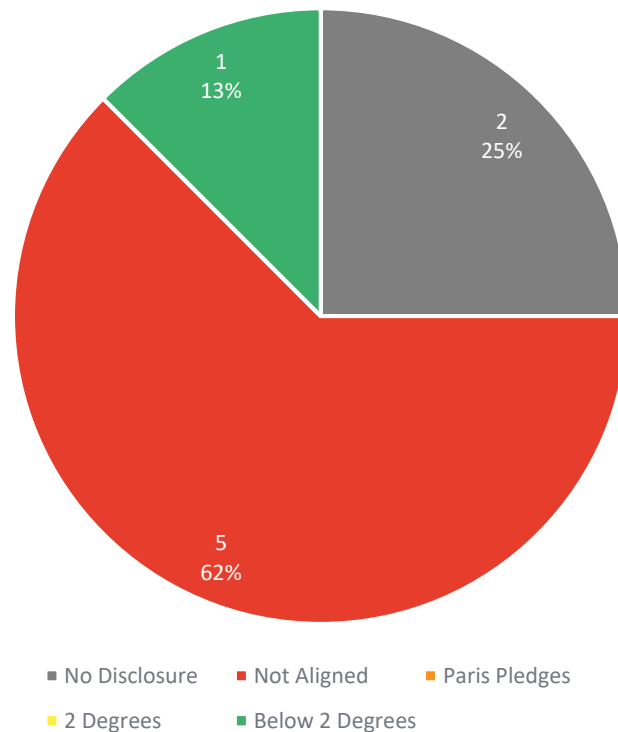
Carbon Performance: alignment with the Paris Agreement benchmarks

Of the 15 aluminium companies included in this report, only eight are assessed on Carbon Performance. Only companies that are involved in both alumina refining and aluminium smelting fit the TPI methodology.

The aluminium sector is one of the worst performing TPI sectors in terms of Carbon Performance. It does only slightly better than oil and gas producers, and airlines.

Only one company is aligned with a Paris benchmark in 2030, namely Norsk Hydro, which is already aligned with the Below 2C scenario based on its current emissions intensity. Although Alcoa's and Rio Tinto's current emissions intensities are aligned with the Paris Pledges, they are no longer by 2030.

There is wide variation in emissions intensity across companies, mainly due to the source of electricity used for smelting.



Alignment of aluminium cos., scaled by production



Source: Company disclosures

■ No Disclosure ■ Not Aligned ■ Paris Pledges ■ 2 Degrees ■ Below 2 Degrees

Alumina



Sector focus: cement producers



Key messages – cement

Compared with other sectors in the TPI database, cement is below average on Management Quality. No cement company is on Level 0, meaning all companies acknowledge climate change as a business issue. On average, the sector is just over halfway between Levels 2 and 3, so it is moving towards integrating climate change into operational decision making. Just under half of the cement companies we assess are now on Levels 3 and 4, indicating they are integrating climate change into operational decision making, or even taking a strategic approach to climate change.

The average Management Quality score of cement companies has remained almost unchanged compared with our previous assessment in mid-2018, but this conceals a number of moves at the company level. No fewer than 48% of companies have changed level relative to our previous assessment, with as many moving up as down.

There has been a considerable improvement in the cement sector's Carbon Performance. The percentage of companies disclosing the information required to carry out a Carbon Performance assessment in the cement sector has gone up from 52% in our previous assessment to 64% now. Alignment with at least one of the Paris benchmarks has more than doubled from 10% to 23%. The sector is also taking a longer view on Carbon Performance, with five companies' emissions reduction targets now extending to 2030 or beyond.



Management Quality level

Companies' Management Quality ratings may not always reflect their most up-to-date disclosures. TPI updates its assessments once a year.

Level 0

Unaware

0 Companies: 0%

Level 1

Awareness

7 Companies: 32%

Anhui Conch Cement
China National Building Materials
China Resources
Semen Indonesia
Sumitomo Osaka Cement
Taiheiyo Cement
Taiwan Cement

Level 2

Building capacity

5 Companies: 23%

Adelaide Brighton
Dangote Cement
Eagle Materials
Fletcher Building
Martin Marietta Materials

Level 3

Integrating into
operational decision
making

5 Companies: 23%

Cemex
CRH
HeidelbergCement
Siam Cement
UltraTech Cement

Level 4

Strategic assessment

5 Companies: 23%

Ambuja Cements
Asia Cement
Boral
LafargeHolcim
Shree Cements

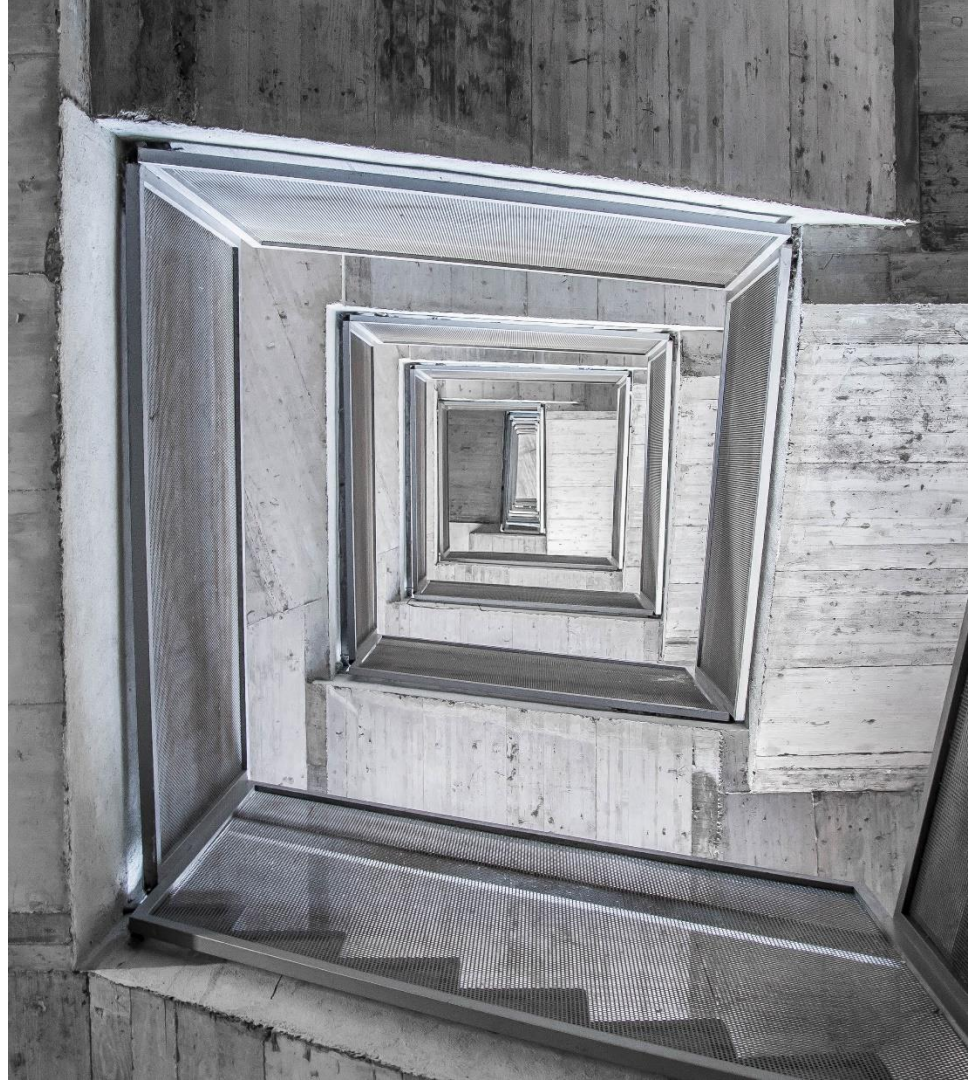


Management Quality level

Cement companies' average Management Quality score is now 2.4, putting the average company in this sector just short of halfway between "Building capacity" (Level 2) and "Integrating into operational decision making" (Level 3). This average is only marginally higher than last year (2.3).

There are no cement companies on Level 0; all companies are acknowledging climate change as a business issue, either explicitly or implicitly. There is a fairly even distribution of companies across Levels 1 to 4, so we do not see the separation of the sector into leaders and laggards like we do in aluminium and steel, for example.

Just under half of the cement companies assessed (10) are now on Level 3 or 4. However, there are still no 4* cement companies, meaning none satisfy all 18 applicable Management Quality criteria.



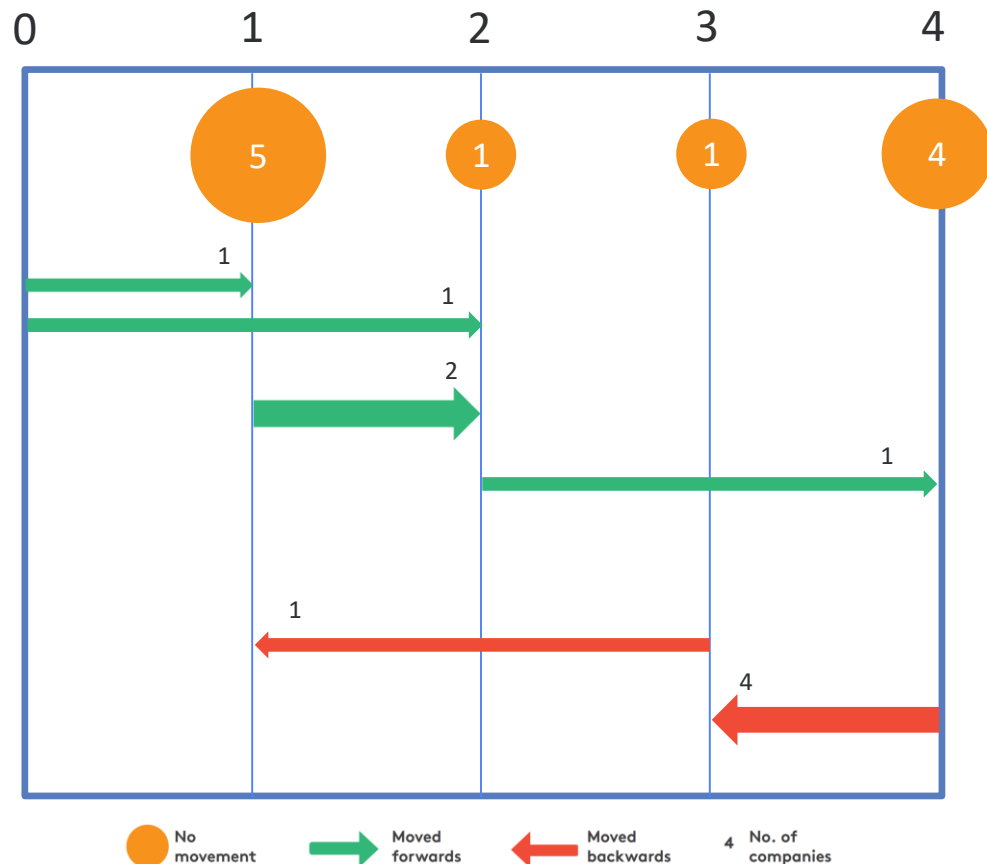
Trends in Management Quality

The average Management Quality score of cement companies has risen very slightly from 2.33 in mid-2018 to 2.36 in this assessment. This is despite considerable movement of individual companies.

Of the 21 cement companies for which we have trend data, 11 (52%) remain at the same level as their last assessment. Five of these are already on Level 3 or 4.

A total of five companies have moved up at least one level and five have moved down at least one level. Progress can be observed mostly towards the bottom of the TPI staircase, while regression is mostly from the top.

Progress is mainly due to explicitly recognising climate change as a business risk/opportunity, and introducing a policy commitment to act on climate change. Three of the 4 drops from Level 4 to 3 are due to companies failing to satisfy the new TPI indicator on disclosure of involvement in trade associations that are active on climate issues.

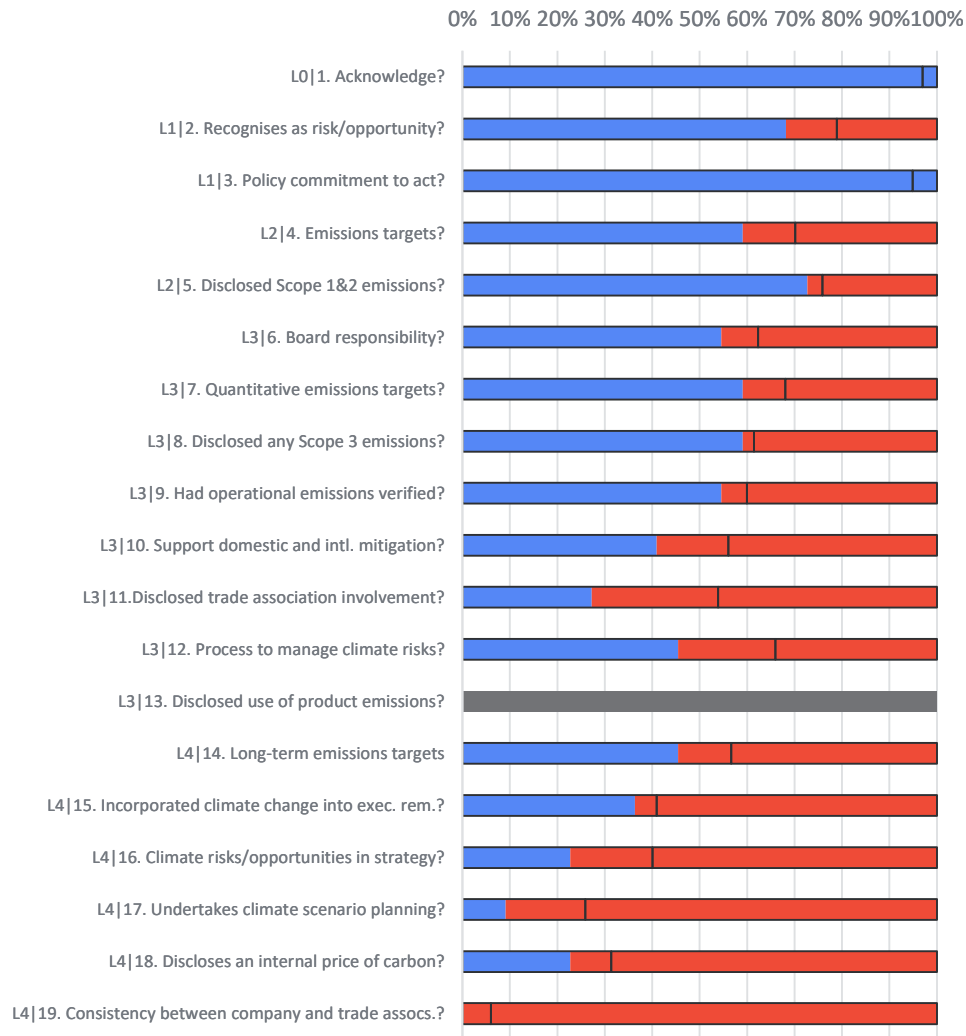


Management Quality: indicator by indicator

All cement companies we assess acknowledge climate change as a significant issue for the business (Q1) and have a policy commitment to act on climate change (Q3).

Conversely cement companies are weaker than average on all other indicators, in particular on disclosing involvement in trade associations engaged on climate issues (Q11), having processes in place to manage climate-related risks (Q12), incorporating climate risks/opportunities in company strategy (Q16) and undertaking climate scenario planning (Q17).

No cement company currently ensures consistency between its climate change policy and the positions taken by those trade associations of which it is a member (Q19).

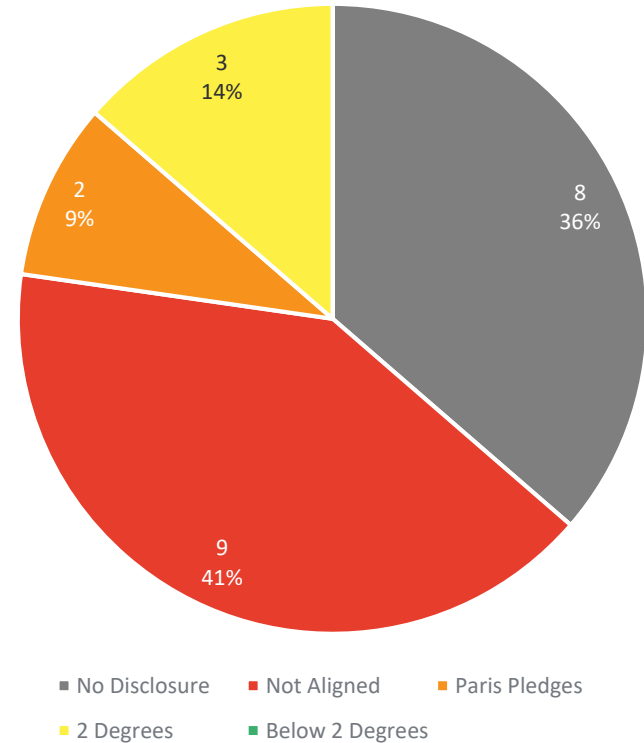


Carbon Performance: alignment with the Paris Agreement benchmarks

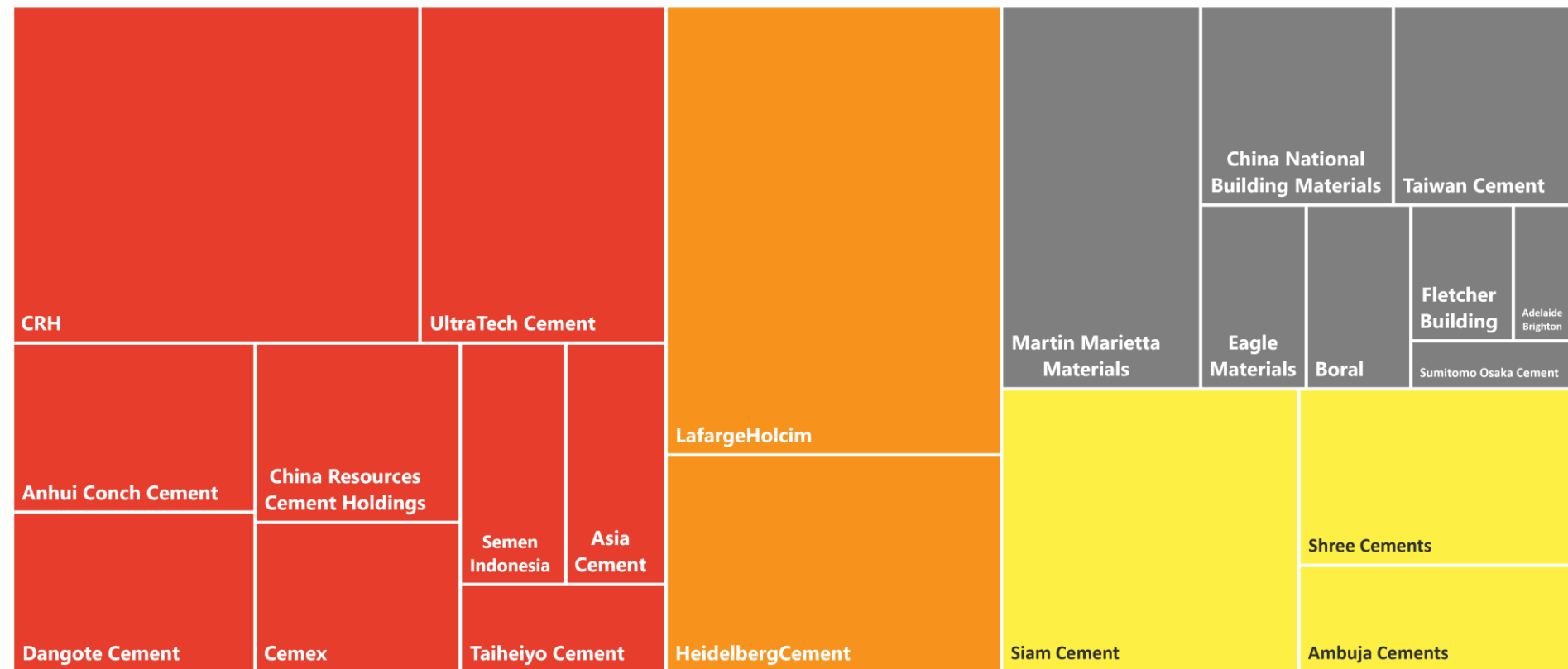
The Carbon Performance of cement producers has improved over the past year due to the introduction of new, long-term targets by ambitious companies, as well as improved disclosure.

The proportion of companies we can assess on Carbon Performance has gone up from 52% in mid-2018 to 64% now, due to improved disclosure. We can benchmark three Asian companies – Anhui Conch Cement, Asia Cement and China Resources Cement Holdings – for the first time. However, disclosure in the cement sector still lags behind other TPI sectors. A feature of the cement sector is that emissions intensity needs to be disclosed in a particular form developed by the Cement Sustainability Initiative, and so basic company financial and ESG disclosures do not suffice.

Alignment with the Paris benchmarks has more than doubled from 10% to 23%. This is down to five companies that have set 2030 targets aligned with at least the Paris Pledges. Ambuja Cements, Shree Cement and Siam Cement are aligned with the 2C benchmark. LafargeHolcim and HeidelbergCement are aligned with the Paris Pledges. However, the majority of companies are still not aligned and cement performs only slightly better than aluminium on Carbon Performance.



Alignment of cement producers, scaled by market cap.

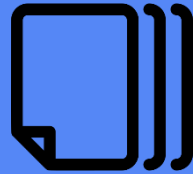


Source for market capitalisation: FTSE Russell (31/12/2019), average of last 4 quarters (before investibility weight)

■ No Disclosure ■ Not Aligned ■ Paris Pledges ■ 2 Degrees ■ Below 2 Degrees



Sector focus: paper producers



Key messages – paper

The paper sector performs poorly on Management Quality. Averaging 2.2, it has one of the lowest Management Quality scores among industrials/materials sectors and among all TPI sectors. Over half of the paper producers we assess are on Level 2 or below, and two companies, Muda Holdings and Nine Dragons, are on Level 0.

It is notable that less than 40% of paper producers have their operational emissions verified. Only one paper company, UPM-Kymmene, assures consistency between its climate change policy and the positions taken by trade associations of which it is a member.

The paper sector has shown little improvement in Management Quality. Although four companies moved up at least one level, two companies moved down one level. However, UK paper maker Mondi is now the first industrials/materials company to receive a 4* rating.

In contrast to their Management Quality, the Carbon Performance of paper companies is relatively strong, with over half of the companies projected to be aligned with the Paris Pledges in 2030. Moreover, 28% of companies will be aligned with the Below 2C benchmark in 2030. Alignment is either achieved through ambitious emissions reduction targets, or because current emissions intensities are already below what is required in 2030. The paper sector is the second-best TPI sector on Carbon Performance.

Management Quality level

Companies' Management Quality ratings may not always reflect their most up-to-date disclosures. TPI updates its assessments once a year.

Level 0

Unaware

2 Companies: 11%

Muda Holdings
Nine Dragons

Level 1

Awareness

4 Companies: 22%

Daio
Hokuetsu
Lee & Man
Shandong Chenming

Level 2

Building capacity

4 Companies: 22%

CMPC
Ence Energia y Celulosa
Nippon Paper
Suzano

Level 3

Integrating into
operational decision
making

4 Companies: 22%

Domtar
DS Smith
International Paper
Oji

Level 4

Strategic assessment

4 Companies: 22%

Mondi*
Sappi
Stora Enso
UPM-Kymmene



Management Quality level

This is TPI's third assessment of the paper sector. We now assess the sector's 18 largest publicly owned companies, selected on the basis of market capitalisation.

The average Management Quality score of the paper companies assessed is 2.2, marginally up from 2.1 last year. This puts the average company between Level 2, building capacity, and Level 3, integrating climate change into operational decision making.

This is the lowest average Management Quality score of any industrials/materials sector. In fact, the paper sector is one of the worst performing sectors on Management Quality in the TPI database at present. More than half of companies are on Level 2 or below.

That said, there are some high performers in the sector, with eight companies on Levels 3 or 4, including one 4* company.



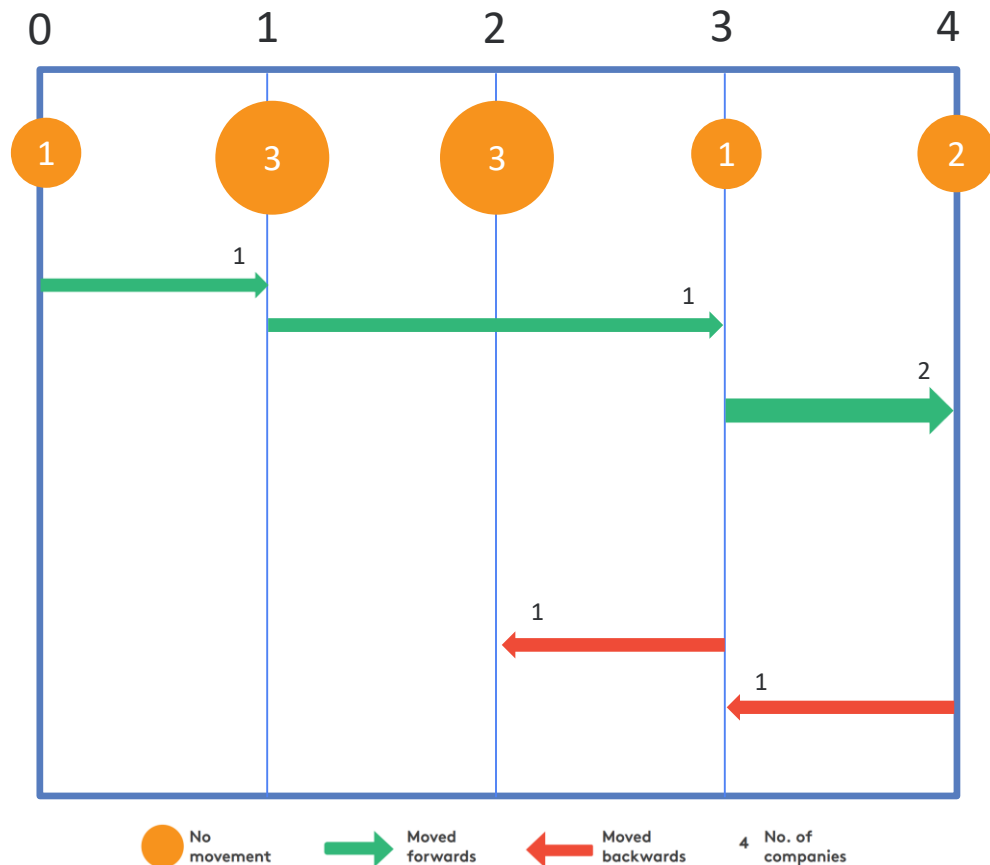
Trends in Management Quality

Of the 16 paper companies for which we have trend data, ten (63%) remain at the same level as their last assessment. Only three of these are already on Level 3 or 4.

A total of four companies have moved up at least one level, while two have moved down at least one level.

Two of the four companies to move up do so, because they have nominated a board member/committee with explicit responsibility for oversight of the company's climate change policy.

Both companies that have moved down do so on the grounds of emissions disclosure: Nippon Paper is assessed as no longer publishing Scope 1 and 2 emissions with the necessary detail; International Paper is assessed as no longer having its operational emissions data verified by a 3rd party.



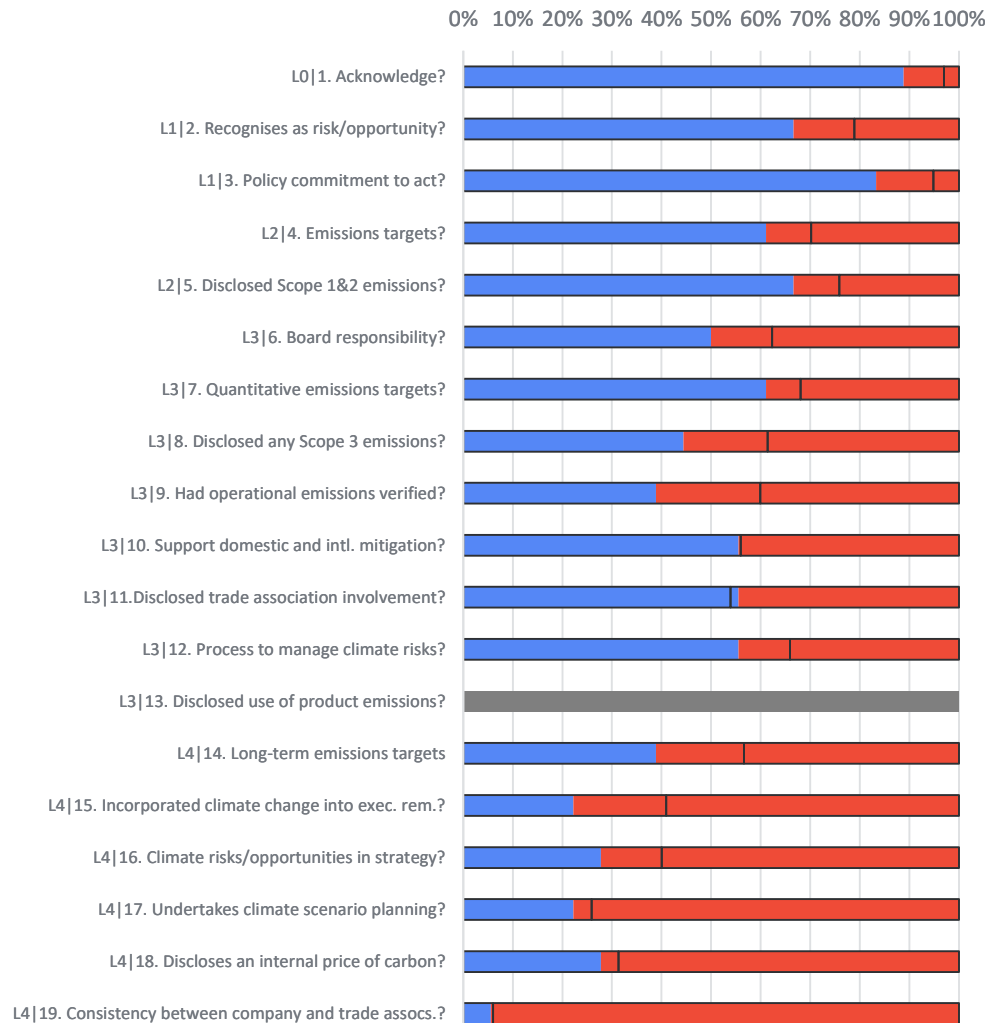
Management Quality: indicator by indicator

In keeping with the sector's low average Management Quality, paper companies perform relatively poorly on almost all of TPI's individual Management Quality indicators.

This is particularly true for:

- explicitly recognising climate change as a business risk/opportunity (Q2);
- disclosing and verifying emissions data (Qs 5 & 9);
- Setting long-term, quantified emissions reduction targets (Q14);
- Incorporating climate change into executive remuneration (Q15).

However, paper companies are more likely than the average TPI company to disclose their membership and involvement in trade associations engaged in climate issues (Q11).



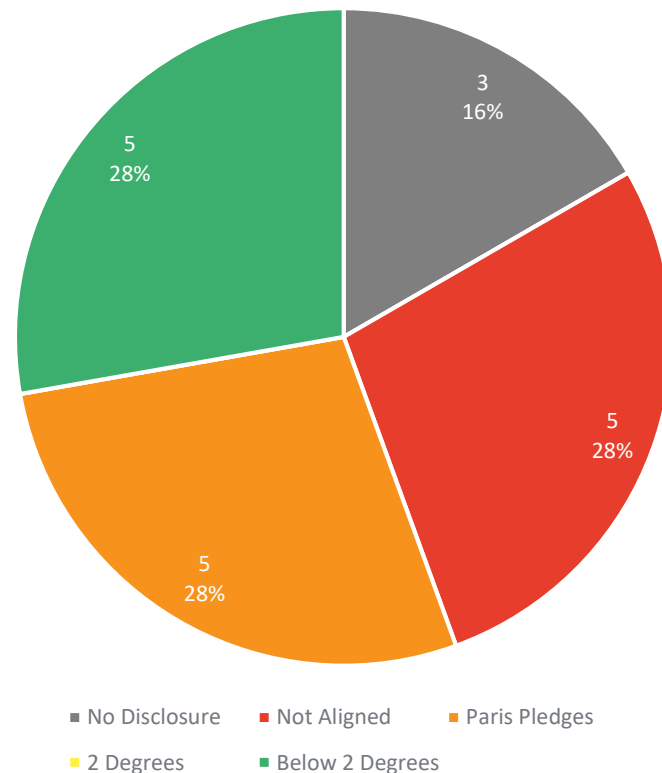
Carbon Performance: alignment with the Paris benchmarks

Unlike Management Quality, the Carbon Performance of the largest publicly owned companies in the paper sector is relatively good.

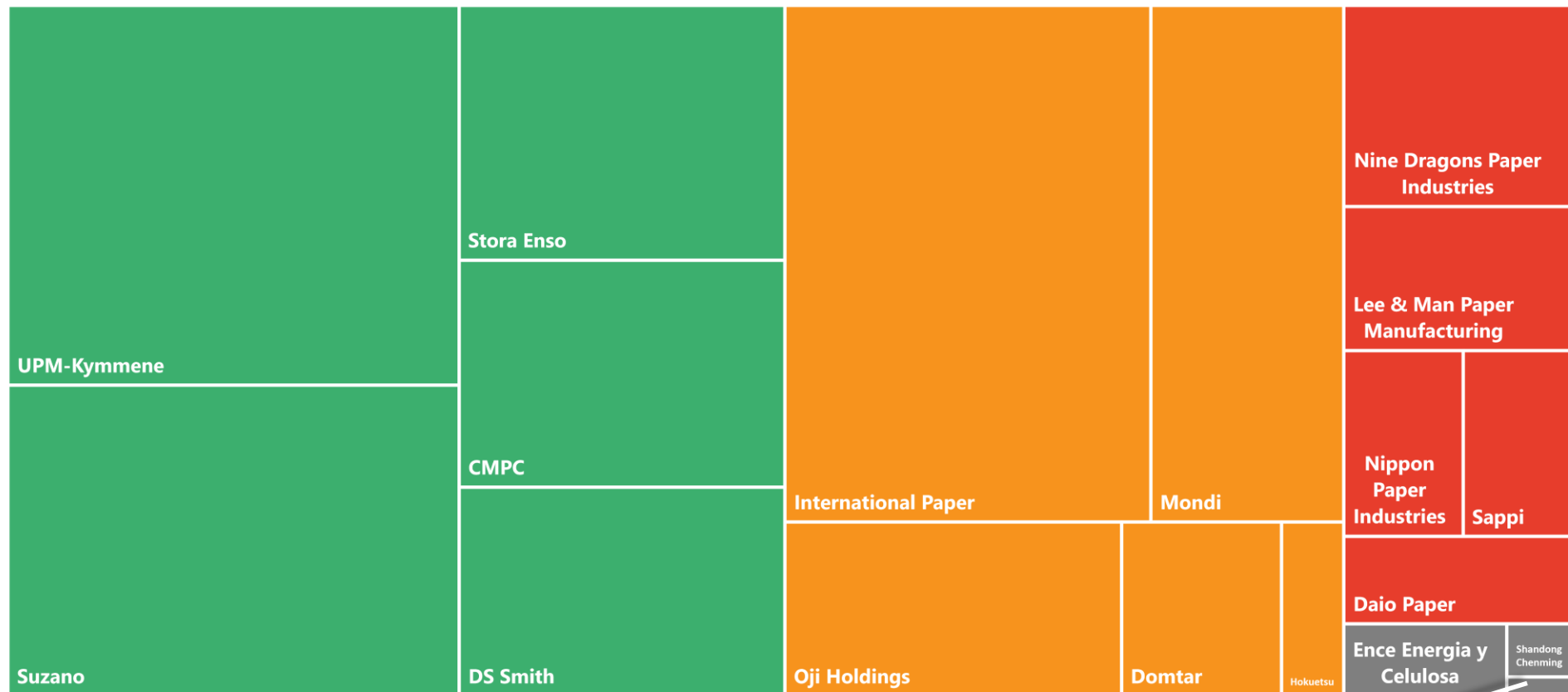
The paper sector is the second-best TPI sector on Carbon Performance. For the first time, over half (56%) of the paper producers we assess are aligned with the Paris Pledges, at least. This makes up nearly half of all companies aligned with the Paris Pledges in industrials/materials.

Five out of 18 companies are aligned with the Below 2C benchmark over the whole research period. Five more companies are aligned with the Paris Pledges in 2030. Half of the aligned companies are on the basis of current emissions or 2020 targets, rather than 2030 targets. CMPC, DS Smith, Stora Enso and UPM-Kymmene have the most ambitious targets.

Three Asian paper companies improved disclosure and can be benchmarked for the first time: Daio Paper, Lee & Man Paper Manufacturing and Nine Dragons Paper Industries.



Alignment of paper producers, scaled by market cap.



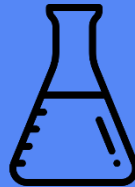
Source for market capitalisation: FTSE Russell (31/12/2019), average of last 4 quarters (before investibility weight)

■ No Disclosure ■ Not Aligned ■ Paris Pledges ■ 2 Degrees ■ Below 2 Degrees

Muda Holdings



Sector focus: chemical companies



Key messages – chemicals

This is our first assessment of the chemicals sector. We assess the 20 largest publicly owned companies active in the production of chemicals, selected on the basis of market capitalisation, as well as one additional large chemical company that is part of the CA100+ initiative. We focus on Management Quality.

We find that the sector performs well on Management Quality, with the average chemicals company above the average company in other industrials/materials sectors and in our database as a whole. In fact, chemicals outperforms every principal TPI sector we assess. 81% of companies are already on Level 3 or 4 and the average level is 3.0. This means that the average chemicals company has already integrated climate change into operational decision making and is beginning to take a more strategic approach to climate change.

However, despite the sector's strong performance on Management Quality, there is no 4* company. Although the sector performs well on many indicators, it is relatively weak on the most advanced indicators. For example, only 19% of companies undertake climate scenario planning. The largest chemicals company by market capitalisation, DowDuPont, is only on Level 1.

The chemical sector is characterised by a complex, heterogeneous array of products and production processes, making Carbon Performance assessment difficult. While chemical companies readily disclose aggregate emissions, more granular emissions and production data would be required to normalise company emissions using a physical intensity measure. That level of detail is not currently provided.



Management Quality level

Companies' Management Quality ratings may not always reflect their most up-to-date disclosures. TPI updates its assessments once a year.



Management Quality level

This is TPI's first assessment of the chemicals sector. We now assess the sector's 20 largest publicly owned companies, selected on the basis of market capitalisation, as well as one CA100+ focus company (Toray Industries).

The average Management Quality score of chemical companies is 3.0, making it the best performing of the TPI's principal sectors, slightly ahead of automobile manufacturers and electricity utilities. The average company has already integrated climate change into operational decision making and is starting to take more strategic actions.

Almost 90% of companies are already on Level 3 or 4, highlighting the strong performance of this sector.

That said, there are some low performers in the sector. In particular, DowDuPont, the world's largest chemical company by market capitalisation, is only on Level 1. No company currently satisfies all Management Quality criteria, which would earn a 4* rating.



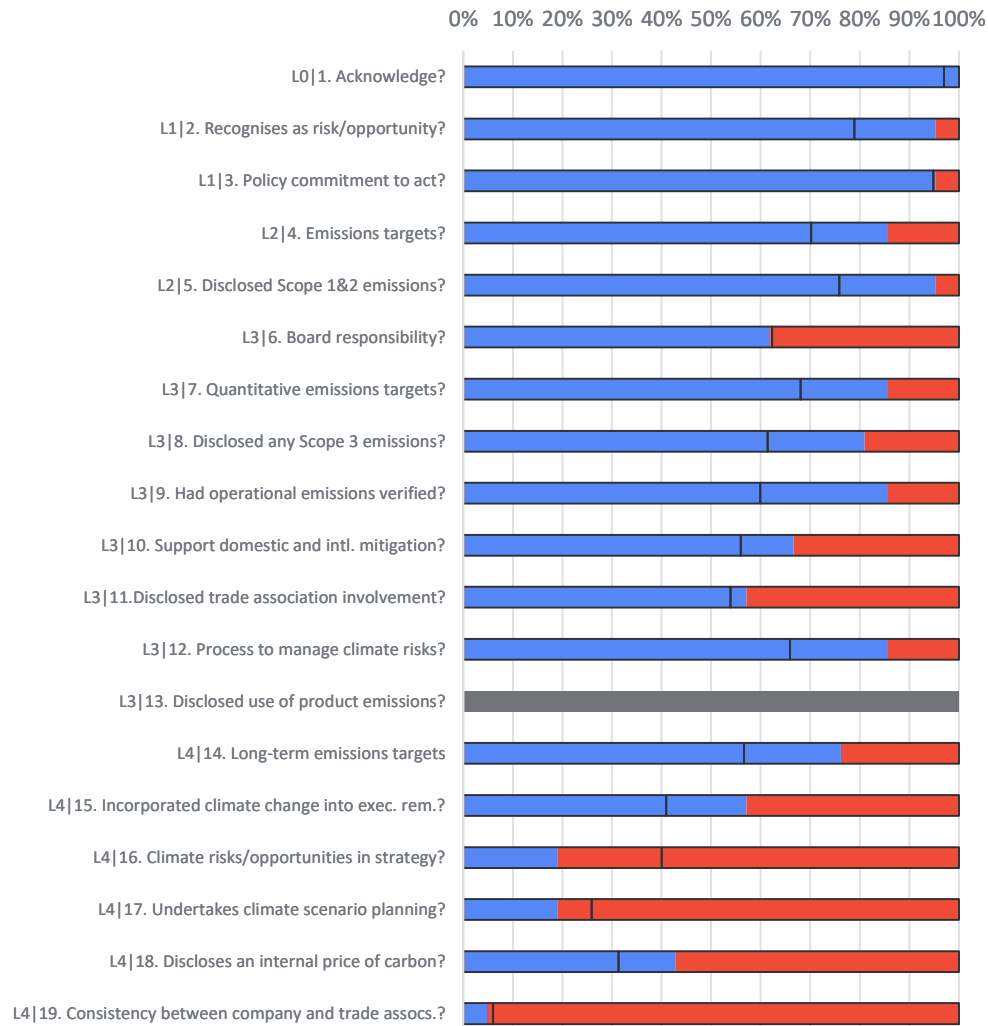
Management Quality: indicator by indicator

In keeping with the sector's high average Management Quality, chemical companies perform strongly on almost all of TPI's individual Management Quality indicators.

This is particularly true for:

- Setting quantitative and long-term emissions targets (Qs 7 & 14);
- Disclosing Scope 3 emissions (Q8);
- Having operational emissions verified (Q9);
- Having a process to manage climate related-risks (Q12).

By contrast, chemical companies perform noticeably poorly on incorporating climate change risks and opportunities in their strategy (Q16). They also perform somewhat below average when it comes to climate scenario planning (Q17).



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