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Aligning with 1.5°C

A benchmark for the chemical sector

ShareAction»

About ShareAction

ShareAction is an NGO working globally to define the highest standards for responsible investment and drive change until these standards are adopted worldwide. We mobilise investors to take action to improve labour standards, tackle climate change and address pressing global health issues. Over 16 years, ShareAction has used its powerful toolkit of research, corporate campaigns, policy advocacy and public mobilisation to drive responsibility into the heart of mainstream investment. Our vision is a world where the financial system serves our planet and its people.

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What is the purpose of this benchmark?

This benchmark enables investors to see whether a chemical company is 1.5°C aligned

To align with 1.5°C pathways, which keep emissions within a strict budget between now and 2050, chemical companies must achieve fast, steep and immediate emissions reductions.[i] Previous research by ShareAction has shown that primary chemical production can become emissions-neutral, and that the economics of this transition are increasingly viable.[1] However, the long life of industrial assets means the sector is only one investment cycle away from 2050: to align with 1.5°C, companies in the sector must make critical decisions now.

ShareAction has produced this benchmark to set clear, measurable and evidence-based standards for a chemical company that is truly aligned with the goal of limiting global warming to 1.5°C. Investors should use the benchmark to assess whether the companies they hold are truly 1.5°C aligned, and engage with them if they fall short.

How should investors use this benchmark?

The benchmark has eleven sections. Each section sets a standard for 1.5°C alignment for an area of a chemical company's climate performance and provides metrics for assessing the company. Sections also explain why each standard has been set.

The sections cover topics like emissions targets, capital spending and climate disclosures. A chemical company that is aligned with 1.5°C low/no overshoot pathways on all scopes, and is prepared for the risks and opportunities of this transition, should align with the benchmark.

Equipped with this benchmark, investors should:

- **Assess** the companies they hold against the benchmark;
- **Identify** areas where companies are not aligned; and
- **Engage** with companies to improve their performance.

1 For details of why and how primary chemical production can become emissions-neutral, see: ShareAction's Slow reactions: chemical companies must transform in a low carbon world. For information on hydrogen production specifically – an important feedstock and product for the sector - see Beyond the blue: renewable hydrogen in the chemical industry.

How were the standards in this benchmark created?

The standards in this benchmark were designed based on research from ShareAction and other organisations. Several of the standards draw on the CA100+ Net Zero Company Benchmark. The benchmark has been tailored specifically to the chemical sector, to allow investors to scrutinize and engage with companies in this sector in detail.

The contents of the benchmark

1 Emissions targets

The Standard:

The company must explicitly commit to align with 1.5°C low/no overshoot pathways. Further, it must commit to mid and long-term emissions targets that are aligned with such pathways.

Metrics for assessment:

The company's emissions targets align with these trajectories, as per the University of Technology Sydney's 1.5°C low/no overshoot pathway for the global chemical sector:

	Reduction on 2019 level		
	Scope 1	Scope 2	Scope 3
2025	-21	-34	-27
2030	-44	-65	-52
2035	-56	-85	-61
2040	-74	-92	-69
2045	-86	-97	-71
2050	-100	-100	-73

Global warming must be limited to 1.5°C to avoid the most severe impacts of climate change

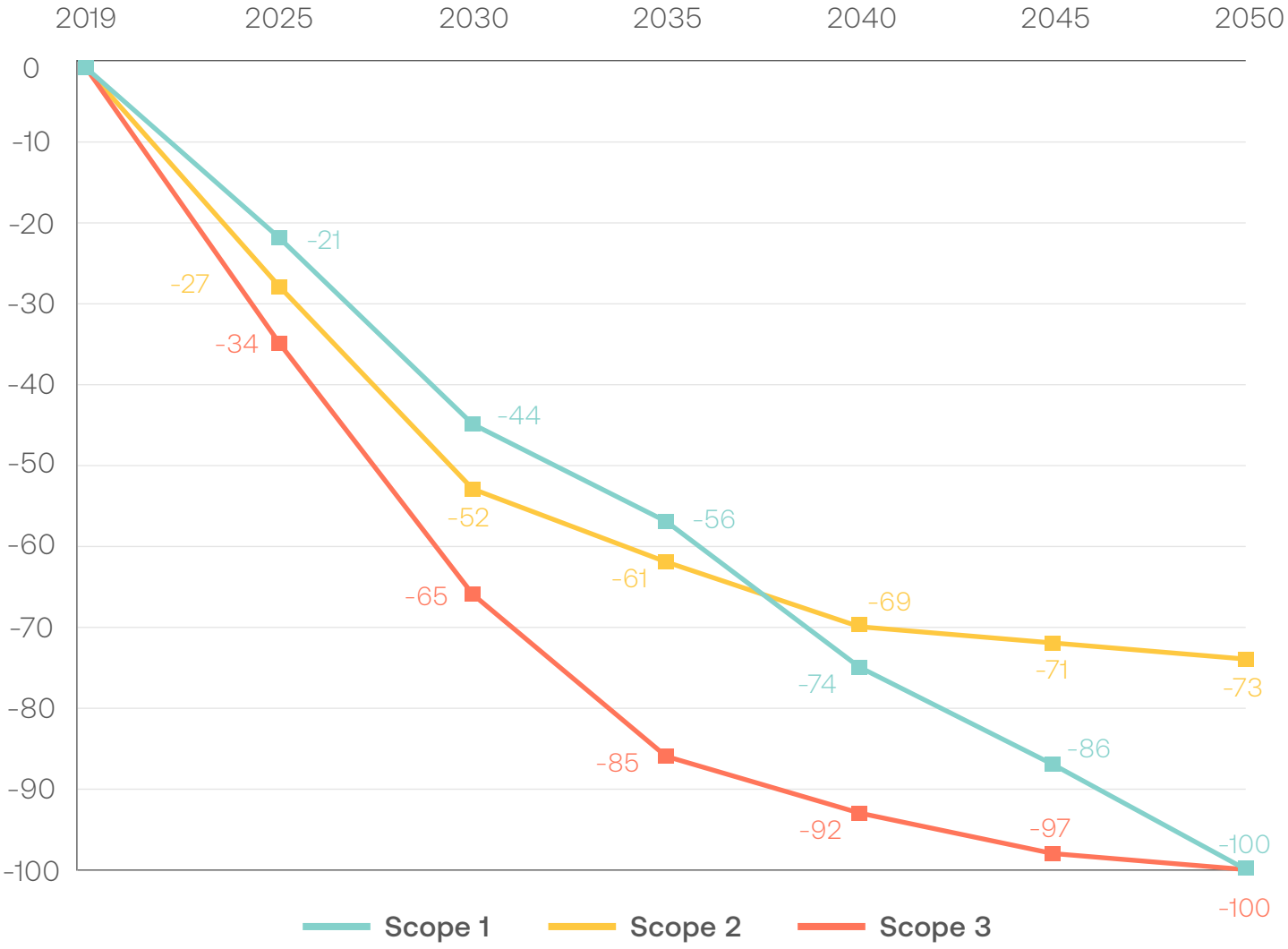
The Intergovernmental Panel on Climate Change (hereafter IPCC) has shown that limiting global mean surface temperature change to 1.5°C above pre-industrial levels would reduce the chance and severity of a wide range of climate risks compared to higher levels of warming.[ii] 'Overshoot' must also be avoided. To quote the IPCC: "Very different impacts result from pathways that remain below 1.5°C versus pathways that return to 1.5°C after a substantial overshoot, and when temperatures stabilize at 1.5°C versus a transient warming past 1.5°C (medium confidence)."[iii]

Fast, steep and immediate emissions reductions are required

Without immediate action it will, in the words of the co-chair of the IPCC working group on climate change mitigation, be "impossible" to limit warming to 1.5°C.[iv] As an analogy, a car driving fast into a corner must brake early to avoid crashing. If the chemical sector does not apply its brakes now, it will exceed its 1.5°C carbon budget.

This standard uses a sector-specific 1.5°C pathway for the chemical sector with a high chance (67 per cent) of low/no overshoot, developed by the University of Technology Sydney.[v]

Figure 1: A 1.5 low/no overshoot pathway for the chemical sector



Source: UTS (2022) *OECM pathway for the global chemical sector.*[vi]

2 Investments in emission-neutral chemical production

The Standard:

The company has committed to transition to emissions neutral feedstocks and production processes for primary chemicals specified in this standard.

The company will phase in emissions-neutral feedstocks and chemical production on a schedule that will achieve 1.5°C aligned emissions reductions, as per the metrics below.

Metrics for assessment:

See sections 2.1 – 2.3 below.

2.1 Producing hydrogen

The Standard:

The company must transition to producing or procuring 100 per cent renewable hydrogen – hydrogen produced by electrolysis, powered by 100 per cent renewable energy sources – for its feedstock needs by 2050 at the latest, on a schedule that will align the company with 1.5°C low/no overshoot pathways.

Metrics for assessment:

- All new plants and assets built after 2025 will be designed to use renewable hydrogen for feedstock;
- All existing plants and assets will be decommissioned or retrofitted to use renewable hydrogen for 100 per cent of hydrogen feedstock needs by 2050 at the latest;
- The company discloses a schedule for existing assets to be decommissioned or retrofitted and new assets to be phased in, that projects the year-on-year emission reductions that will be achieved, and these are aligned with 1.5°C low/no overshoot pathways; and
- The company is not investing in any new unabated fossil fuel-based assets.

The process for producing renewable hydrogen is explained in our **previous investor briefing**.

2.2 Sourcing carbon feedstock

The Standard:

The company must transition to producing or procuring appropriate sources of carbon for all of its carbon feedstock needs by 2050 at the latest, on a schedule that will align the company with 1.5°C low/no overshoot pathways.

Carbon can come from four sources:

1. Direct air capture;
2. As an intermediate solution, carbon captured from as-yet unavoidable emissions in other industrial processes, such as cement production;
3. Carbon from the gasification of waste, where the gasification process meets strict conditions (see Section 8); and
4. Carbon from 'avoid-or-explain' technologies and materials that the company can credibly demonstrate are 1.5°C aligned (see Section 3).

Metrics for assessment:

- All new plants and assets built after 2025 will be designed to use appropriate sources of carbon for feedstock;
- All existing plants and assets will be decommissioned or retrofitted to use use appropriate sources of carbon for 100 per cent of carbon feedstock needs by 2050 at the latest;
- The company discloses a schedule for existing assets to be decommissioned or retrofitted and new assets to be phased in that projects the emission reductions that will be achieved over time, and these are aligned with 1.5°C low/no overshoot pathways; and
- The company is not investing in any new unabated fossil fuel-based assets.

2.3 Producing emission-neutral primary chemicals

The Standard:

The company must transition to emissions-neutral feedstocks and production processes for ammonia, methanol, olefins (ethylene and propylene) and aromatics (benzene, taurine and xylene) at all of its plants by 2050 at the latest, on a schedule that will align the company with 1.5°C low/no overshoot pathways.

Metrics for assessment:

- All new plants for the production of the specified chemicals built after 2025 must be based entirely on emission-neutral production processes;
- All existing plants for the production of the specified chemicals will be decommissioned or retrofitted for emission-neutral production processes by 2050 at the latest;
- The company discloses a schedule for existing assets to be decommissioned or retrofitted and new assets to be phased in that projects the emission reductions that will be achieved over time, and these are aligned with 1.5°C low/no overshoot pathways; and
- The company is not investing in any new unabated fossil fuel-based assets.

Reminder: How can emissions-neutral primary chemicals be produced?

- Emissions-neutral ammonia is made with nitrogen drawn down from the air and renewable hydrogen, fed into a process where all energy requirements are electrified and run off 100 per cent renewable energy.
- Emissions-neutral methanol is made with circular carbon and renewable hydrogen, fed into processes where all energy requirements are electrified and run off 100 per cent renewable energy.
- Emissions-neutral olefins and aromatics are made using emissions-neutral methanol as feedstock, which is fed into processes where all energy requirements are electrified and run off 100 per cent renewable energy.

To learn about emissions-neutral processes and how they are different from fossil fuel-based processes, please read our **previous investor briefing**.

Companies must transition to truly emissions-neutral chemical production by 2050

Chemical companies need to change their chemical production processes to eliminate emissions which are created by their use of fossil fuels. Emissions come especially from two places:

- **Fossil fuels for energy**: fossil fuels are burned to produce electricity and heat;
- **As feedstocks**: fossil fuels are used as a source of hydrogen and carbon, the ingredients to make chemicals. Fossil carbon is released either as a by-product of chemical production processes (if there is excess) or when fossil carbon is embodied in chemical products and released downstream. For example, when a plastic bottle is incinerated; and
- **Both** uses drive oil and gas extraction, which creates methane emissions upstream.

Companies need to replace fossil feedstocks with emissions-neutral feedstocks, which can then be fed into new electrified processes, powered by 100 per cent renewable energy sources. This can eliminate scope 1 and 2 emissions, and significantly reduce scope 3 emissions[2], allowing primary chemical production to align with 1.5°C low/no overshoot pathways.

Chemical plants are designed for long life – a plant can last several decades – so assets built now will determine how far a company can reduce emissions over the next decades to 2050. This is why, as this standard specifies, new plants must be emissions-neutral by design.

2 Ammonia scope 3 emissions cannot be avoided even if its production is emissions neutral because when it is used as fertilizer it reacts with the air to form nitrous oxide, a potent greenhouse gas.

3 Investments that companies must avoid or explain

The Standard:

The company must either: **avoid** investing in the following technologies or materials; or it must **explain** why it has invested in them and produce credible evidence that its activity is aligned with 1.5°C low/no overshoot pathways.

'Avoid or explain' technologies and materials (see Appendix for details):

- Carbon capture and 'blue' hydrogen;
- Steam cracker electrification;
- Methane pyrolysis; and
- Biomass for feedstocks.

New investments in unabated fossil fuel-based assets cannot be aligned under any circumstances.

Metrics for assessment:

Either

- The company does not invest/has not stated an intention to invest in any 'avoid or explain' technologies or materials.

Or

- The company is invested in/has stated its intention to invest in 'avoid or explain' technologies or materials; it has produced evidence* that this activity will be aligned with 1.5 low/no overshoot pathways on all scopes for its full lifespan.

* Evidence could include a full cradle-to-grave lifecycle assessment that does not count avoided emissions, or a schedule of retrofitting or decommissioning that is consistent with 1.5°C low/no overshoot pathways.

Any ‘low carbon’ approach that cannot eventually achieve emissions-neutrality is a cause for concern

There are three types of technologies or materials that a chemical company could invest in:

- Investments in new unabated fossil fuel assets, which cannot be 1.5°C aligned;
- Investments in 1.5°C-aligned emissions-neutral assets and feedstocks; and
- Technologies and feedstocks that are lower emissions than unabated fossil fuel assets and feedstocks but which are unlikely to be emissions neutral, or could only be emissions neutral under very strict conditions, and so are unlikely to be 1.5°C aligned.

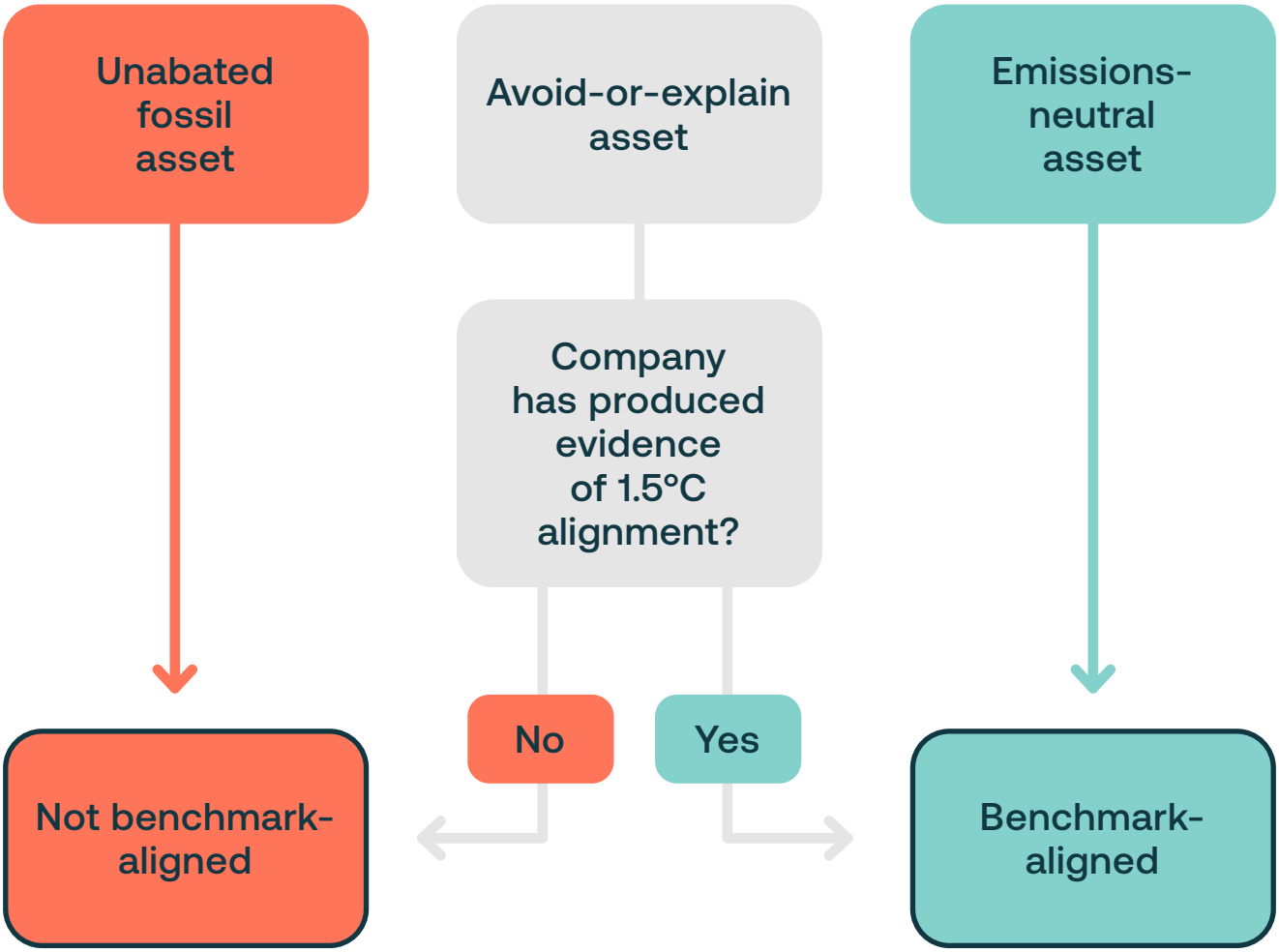
Several companies are exploring technologies and materials that fall into the third category. Companies may variously claim they are ‘low’ emissions, a ‘transitional’ solution or a ‘bridge’ to net zero. However as these are unlikely to become emissions neutral, or could only be emissions neutral under strict conditions, they are likely to be unsuitable by 2050, if not sooner.

The reasons why the listed technologies and materials have been classed as ‘avoid or explain’ are discussed in Appendix: 'avoid-or-explain' technologies and materials.

A company with ‘avoid-or-explain’ investments must show that they are 1.5°C aligned

If companies cannot produce credible evidence that their investments are aligned with 1.5°C then investors are exposed to risk. These technologies can all be high-cost, long-life investments; by locking in emissions and capital these investments could at best represent an opportunity cost, and at worst they could become stranded.

Figure 2: A flow diagram for evaluating a chemical company's investments



Source: ShareAction (2022).

4 Capital spending alignment

The Standard:

100 per cent of the company's capital spending on new and existing assets is aligned with 1.5°C low/no overshoot pathways, as per the criteria below.

Metrics for assessment:

- See figure 3 below.

100 per cent of companies' capital investments must be aligned with 1.5°C low/no overshoot pathways

Investments in assets that will enable a company to transition to emissions-neutral chemical production are one of the clearest indicators of whether a company is truly 1.5°C aligned.

This standard was informed by the CA100+ Net Zero Company Benchmark.[vii] Investors need to scrutinise capital spending closely. Where capital spending is to pay for an asset that will not be emissions-neutral from its inception (on at least scopes 1 and 3 – scope 2 decarbonisation can follow after an asset has come online), a company must produce evidence that emissions from that asset will be aligned with 1.5°C low/no-overshoot pathways for its lifespan.

Investors should compare companies' capital spending to the 'aligned' CAPEX types in Figure 3. If this reveals that the company is investing in unaligned CAPEX, or that company disclosure is insufficient to assess this, investors should ask the company why, and what climate-related risks this creates.

Figure 3: Standards for assessing whether chemicals capital spending is aligned with 1.5°C low/no overshoot pathways

1.5°C Aligned?	CAPEX type:	Description:	Relevant assets		
			Hydrogen	Carbon	Chemical production
ALIGNED	Emissions-neutral asset	New assets, energy and feedstock procurements that are emissions-neutral	Electrolysers Renewable energy assets and power purchase agreements	Direct air capture technology Procurement of captured carbon from unabatable industrial emissions A plastic waste gasification plant that meets the criteria in Section 8 of this benchmark	Chemical plant or production unit where the feedstocks are emissions-neutral and the process energy and heat requirements are electrified Heat pump
	Maintaining existing assets (Aligned)	To prolong the life of existing assets; company has produced evidence that this is consistent with an asset decommissioning/ retrofitting schedule that is aligned with 1.5°C low/no overshoot pathways	Repair of a steam methane reformer, steam cracker that will be decommissioned to 1.5°C-aligned schedule	Repair of a steam methane reformer, steam cracker that will be decommissioned to 1.5°C-aligned schedule	Repair to a conventional chemical plant that will be decommissioned or retrofitted to 1.5°C-aligned schedule
	Investments in 'avoid-or-explain' technologies or materials (see Section 3) (Aligned)	New assets that will not achieve full decarbonisation; company has produced evidence that emissions across all scopes will be aligned with 1.5°C low/no overshoot pathways for the lifetime of the asset	New methane pyrolysis plant, company has produced evidence of alignment, to be decommissioned before 2050	An electrified steam cracker that will not operate beyond 2050, and for which company has produced evidence that emissions will be 1.5°C aligned on all scopes for the lifetime of the asset	An electrified steam cracker that will not operate beyond 2050, and for which company has produced evidence that emissions will be 1.5°C aligned on all scopes for the lifetime of the asset
NOT ALIGNED	High-carbon investment	New assets for conventional, fossil fuel-based chemical production processes	A new steam methane reformer, coal gasifier	A new steam methane reformer, coal gasifier	A new conventional fossil-based methanol plant
	Maintaining existing assets (Not aligned)	To prolong the life of existing assets; inconsistent with 1.5°C low/no overshoot pathways; or company has not demonstrated that consistent	Repair of a steam methane reformer that should no longer be in operation	Repair of a steam methane reformer, steam cracker, that should no longer be in operation	Repair to a steam cracker that should no longer be in operation
	Investments in 'avoid-or-explain' technologies (See Section 3) (Not aligned)	New assets that will not achieve full decarbonisation; inconsistent with 1.5°C low/no overshoot pathways; or company has not demonstrated that consistent	New methane pyrolysis plant with lifespan beyond 2050 or if company has failed to evidence its 1.5 alignment	New electric steam cracker with lifespan beyond 2050 or if company has failed to evidence its 1.5°C alignment	New electric steam cracker with lifespan beyond 2050 or if company has failed to evidence its 1.5°C alignment

Source: ShareAction (2022)

5 Carbon pricing

The Standard:

The company has set a company-wide internal carbon price covering all geographies and scopes, to drive low-carbon investment in line with 1.5 low/no overshoot pathways.

Metrics for assessment:

- The company has set and disclosed an internal carbon price which covers all geographies and scopes; and
- The internal carbon price strongly influences decision making; the company discloses the process by which its internal carbon price is factored into decision making.

Companies must use an ambitious internal carbon price

Carbon has to be priced at a level that makes it attractive for companies to decarbonise fast enough to align with 1.5°C. Currently less than 4 per cent of global emissions are priced at a rate that would deliver the Paris Agreement goal of keeping warming below 2°C.[viii] This means companies need to set an ambitious internal price that is not indexed to government-led carbon pricing schemes.

The IPCC has stated that "the price of carbon varies substantially across models and scenarios, and their values increase with mitigation efforts…(high confidence).[ix] It is nonetheless clear that 1.5°C low/no overshoot aligned pricing needs to be especially ambitious. The IPCC continues, "values for 1.5°C-low-[overshoot] pathway are relatively higher than 1.5°C-high-[overshoot] pathway in 2030, but the difference decreases over time, particularly between 2050 and 2070."[x]

How companies use carbon pricing is just as important as the price itself

To be effective, internal carbon pricing needs to have a deep impact on how companies make decisions, being a priority factor in capital expenditure and investment decisions at every level. Simply setting a high shadow price is not enough if the company does not give weight to carbon price projections. Each company will have different processes for applying carbon pricing, but all should disclose precisely how it is factored in decision making.

6 Reducing scope 3 emissions

The Standard:

The company is acting to reduce scope 3 emissions beyond its direct control. It is engaged with its value chain to align with 1.5°C low/no overshoot pathways.

(This section relates to scope 3 emissions that are not related to fossil fuels purchased by the company for energy and as feedstocks.)

Metrics for assessment:

- The company expects its suppliers and customers to explicitly commit to align with 1.5°C low/no overshoot pathways;
- The company engages with its suppliers and customers, and reports on who it has engaged with and the outcomes of engagement.

Companies must align their value chain with 1.5°C

Companies need to reduce scope 3 emissions by more than 50 per cent by 2030, and by almost three quarters by 2050. By switching to emissions-neutral feedstocks companies can significantly reduce their scope 3 emissions upstream and downstream, but other sources of scope 3, like transport, must be resolved by companies in the value chain. By engaging with suppliers and customers – communicating expectations, creating incentives and disincentives – companies can use a range of approaches to reduce their scope 3 emissions.[xi]

7 Setting green revenue targets

The Standard:

The company has set a target for revenue from the sale of emissions-neutral chemicals, which are compliant with the production processes listed in Section 2 of this benchmark, to represent a proportion of overall sales in a future year.

Metrics for assessment:

- The company has set a green revenue target. The target is for a specified proportion of revenue to be from the sale of emissions-neutral chemicals in a future year.

Green revenue targets can encourage companies to reduce their emissions

By linking climate targets to financial performance, green revenue targets can be a powerful incentive for companies to reduce their emissions. To have this effect, ambitious metrics for 'green revenue' are needed that will set a high standard. Revenue should only be considered green if it is from the sale of chemicals which are made with emissions-neutral feedstocks, in an electrified process run from 100 per cent renewable energy, as per Section 2 of this benchmark.

Revenue from chemicals made in plants that are not yet completely emissions-neutral should not be counted as green. Neither should revenue from chemicals where emissions-neutral content has been allocated with a mass balance approach.

8 Enabling the circular economy

The Standard:

The company is committed to enabling the circular economy by (1) creating materials that are safe and easy to reuse and circulate; and (2) by developing appropriate recycling technologies.

Metrics for assessment:

- See Sections 8.1-8.2 below.

8.1 Products that are safe and easy to circulate

The Standard:

The company is committed to eliminating hazardous substances in its chemical products, in order to promote reuse and recycling.

Metrics for assessment:

- The company discloses all of the intentionally added chemical ingredients in its products;
- The company discloses an assessment of the presence of hazardous chemicals in its products; and
- The company has a strategy for eliminating or substituting hazardous substances from its products.

8.2 Developing appropriate recycling methods (chemical recycling)

The Standard:

If the company is developing, or intends to develop waste-to-feedstock chemical recycling technologies:

The company's chemical recycling project meets the following criteria:

- It will align with 1.5°C low/no overshoot pathways;
- The feedstock it produces will be compatible with emissions-neutral chemical production processes as per Section 2 of this benchmark; and
- In accordance with the waste hierarchy, the company will only chemically recycle plastic waste that cannot be reused or recycled by other means.

Metrics for assessment:

- The company does not own or invest in pyrolysis assets, or it has committed to exit any investments in pyrolysis by 2050 at the latest;
- Any gasification assets owned or financed by the company will –
  - Heat the gasifier with electricity and have a plan to source 100 per cent renewable electricity by 2050 at the latest;
  - Use renewable hydrogen to upgrade the 'raw' syngas from the gasifier (which would eliminate CO2 emissions at this stage);
  - Not sell any syngas for fuel; and
- The company commits that any feedstocks it purchases will be from chemical recycling facilities that are compliant with these conditions by 2050 at the latest.

This standard is based on previous research by ShareAction on how chemical producers can align with the circular economy. Please read our previous investor briefing for more detail.

Companies must enable the circular economy to reduce their emissions and plastic pollution

Enabling the circular economy will help the chemical sector to reduce its emissions and to tackle plastic pollution created by over-production and over-reliance on short-life plastic products. By eliminating hazardous substances from their products, chemical companies will create materials that are safe and easy to reuse and circulate. This will reduce companies' impacts on health and the environment, and make it easier to reduce demand for new materials.

Chemical companies can also use plastic waste as a source of carbon to produce new chemicals and plastics, with chemical recycling. However, these technologies are not proven at scale. If companies are investing in chemical recycling they must ensure these investments are 1.5°C aligned – as per the strict conditions set out in this standard.

Chemical recycling is not the answer to addressing the problem of 'hard-to-recycle' products; in a circular economy, in all but a few discrete cases, hard-to-recycle products should be designed out of use. Chemical recycling should only ever be a last resort for plastic waste when all other options for reuse and recycling have been exhausted.

9 Responsible lobbying

The Standard:

The company's lobbying promotes and promotes and protects policies in line with the goal of limiting warming to 1.5°C without overshoot.

Metrics for assessment:

- The company explicitly commits to align all of its lobbying activity with the goal of limiting global warming to 1.5°C;
- The company expects its trade associations to explicitly commit to align all of their lobbying activity with the goal of limiting global warming to 1.5°C;
- The company audits its trade associations' lobbying positions at least annually and publishes evidence of its engagement with associations where their lobbying positions are not 1.5°C aligned;
- The company discloses all lobbying activities in all jurisdictions, including:
  - trade association membership;
  - political donations and money paid to lobbyists;
  - meetings with lobbyists and politicians with disclosure of what was discussed;
  - policy submissions; and
- The company has policies to prevent corruption and conflicts of interest.

Companies must lobby responsibly to support the 1.5°C temperature goal

Lobbying can be a force for good when used to support progressive legislation and standards. Equally it can be used to counter them, reduce ambition and slow progress towards achieving climate goals.[xii]

The basis of this standard is the Responsible Lobbying Framework, a benchmark designed by leading civil society organisations including, *Transparency International*, *InfluenceMap* and the *Organisation for Economic Cooperation and Development*, to ensure that all lobbying is within the public interest and transparently disclosed. It also draws on the CA100+ Net Zero Company Benchmark Indicators on Climate Policy Engagement.[xiii]

10 Climate governance

The Standard:

The company has clearly designated responsibility for climate at c-suite level and links executive renumeration to 1.5°C-aligned emissions targets. It appoints board members who are qualified to manage a 1.5°C-aligned transition.

Metrics for assessment:

- Responsibility for climate and sustainability goals is clearly designated at c-suite level to the CEO and at least one other senior executive;
- The company links the renumeration of the CEO and at least one other senior executive with climate responsibility directly to progress against 1.5°C-aligned emission targets, either through salary, bonuses or long-term incentive plans;
- Responsibility for oversight of climate-related issues is clearly designated at board level;
- The company appoints board members who have worked in a sustainability-oriented company or field, or have held positions related to sustainability, climate strategy or decarbonisation in heavy industry; and
- The climate competence of the board is assessed in the company's audit of the board, and the company discloses the results and metrics of this audit at least annually.

Companies need effective climate governance to deliver a 1.5°C-aligned transition plan

Boards must understand how climate change and 1.5°C alignment will affect the company in order to fulfil their long-term stewardship opportunities[xiv]; and the c-suite must be able to make effective decisions to manage the transition.

This standard was informed by the CA100+ Net Zero Company Benchmark.[xv] Companies can meaningfully link executive compensation – through salary, bonus schemes, or long-term incentive plans/share ownership – to performance against climate targets to drive progress. This standard is not prescriptive about which mechanism should be used; any of these could create a strong incentive.[xvi] However, in order to be effective, a significant proportion of compensation should be linked to a meaningful and specific target: a near-term 1.5°C-aligned emissions target (see Section 1).

11 Disclosures and assessment of climate-related risks

The Standard:

The company discloses comprehensively against the recommendations of the Taskforce for Climate-related Financial Disclosures, the Carbon Disclosure Project, and the additional requirements in this benchmark.

Metrics for assessment:

Participation in disclosure exercises:

- The company discloses in accordance with the recommendations of the Task Force on Climate-Related Financial Disclosure; and
- The company completes a Climate Change questionnaire for the Carbon Disclosure Project.

TCFD disclosure: areas for attention:

As per TCFD disclosure 2A, 'Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term':

- The company describes its assessments of risks under each of the risk categories described in Examples of Climate-Related Risks and Potential Financial Impacts;
- The company describes its assessments of specific risks, not just types of risk. For example, the company does not just disclose that it faces financial risks, but describes a specific risk. E.g. of margin pressure due to rising feedstock prices under a particular warming scenario;
- Risks to the whole company, specific sections of the company's business, and to different geographies the company operates in are identified and described as appropriate;
- The company discloses its assessment of the following risks and opportunities:
  - Asset stranding;
  - Different future carbon pricing scenarios;
  - Different future feedstock price scenarios; and
  - A transition to emissions-neutral processes and feedstocks as per Section 2.

As per TCFD recommended disclosure 2C, 'Describe the resilience of the organization's strategy, taking into consideration different climate related scenarios, including a 2°C or lower scenario':

- The company describes its use of a quantitative climate scenario in which warming is limited to 1.5°C without overshoot;
- The company uses scenarios to test the resilience of its strategy to the following risks and opportunities:
  - Asset stranding;
  - Different future carbon pricing scenarios;
  - Different future feedstock price scenarios; and
  - Risks and opportunities from a transition to emissions-neutral processes and feedstocks as per Section 2.
- The company discloses the inputs and findings for all of its quantitative or qualitative climate scenario analyses.

Additional disclosure requirements:

- The company discloses capital spending on new and existing assets, broken down by the type of asset, and by plant/facility, across all geographies. This information is reported at least annually.

Companies must disclose on how they are responding to climate change

Disclosure on climate allows investors, companies, and the societies they operate in to see clearly how companies are affecting and affected by climate change. It reveals the depth of a company's climate strategy and brings light to areas that have not been thought through properly. Companies should report against both the TCFD and CDP to provide consistent, precise and comparable information.

This standard was informed by the CA100+ Net Zero Company Benchmark.[xvii] Investors should pay special attention to the *areas for attention* and *additional disclosure requirements*. Companies may report that they disclose against TCFD recommendations and/or through the CDP, when in reality their disclosures are incomplete or too vague to make a proper assessment.

In particular, companies should assess the resilience of their strategy against a 1.5°C low/overshoot scenario, specifically. They should disclose all of the findings of this assessment, as well as the inputs and assumptions that underpin their modelling.

Further, detailed disclosures on capital spending plans is critical for investors. Capital spending is the clearest indicator of whether a company is doing what is necessary to reduce its emissions in line with 1.5°C pathways. Without this, it is difficult to confirm any company's alignment or its vulnerability to climate risk.

Appendix: ‘avoid-or-explain’ technologies and materials

Carbon capture in chemical plants

Why is this an ‘avoid-or-explain’ technology?

Carbon capture means capturing CO2 at the source of emissions to be stored underground, pumped into oil fields to displace oil and improve yields (enhanced oil recovery), or used as a raw material.

Carbon capture does not result in zero emissions. Its carbon footprint will depend on the capture rate, the source of the energy it uses, and the fate of the captured CO2. Most projects globally are underperforming on capture rate goals[xviii]. As companies need to have eliminated scope 1 emissions by 2050 at the latest, this is not a long-term solution.

Even if capture rates were 100 per cent, burning fossil fuels for energy or using them as feedstocks will always create upstream emissions from oil and gas extraction. Methane emissions by major oil and gas companies have recently been revealed to be 70 percent higher than official figures.[xix] Downstream, the continued use of fossil feedstock will mean that fossil carbon is embodied in chemicals and eventually released as scope 3.

What is the alternative?

Rather than trying to capture fossil carbon from processes, using emissions-neutral feedstocks and and electrified production processes would eliminate the need for carbon capture in chemical plants.

Carbon capture may be an appropriate technology in other industries that cannot yet decarbonise, such as cement production. CO2 captured here could be used as a feedstock in chemical production as an intermediate solution.

Steam cracker electrification

Why is this an 'avoid-or-explain' technology?

Steam cracking is a main production method for a group of primary chemicals known as 'high value chemicals'. A fossil feedstock – e.g. naphtha or ethane, by-products of oil refining – is mixed with steam and heated in a furnace to 'crack' heavy hydrocarbons into shorter ones, which become primary chemicals.[xx] Steam cracking requires very high temperatures to produce steam and heat the furnace, which are produced by burning fossil fuels. Some companies are trying to electrify heat generation instead.

Electric steam cracking would not be 1.5°C aligned unless process emissions could be entirely eliminated and the feedstock was itself emissions neutral. *Shell* and *Dow,* who are collaborating on the development of electrified cracking, hope that this could reduce the scope 1 emissions from cracking by 90 per cent.[xxi] The continued use of fossil feedstocks for steam cracking would again lock in high scope 3 emissions upstream and downstream.

What is the alternative?

The alternative is to transition to making high value chemicals from green methanol, produced with renewable hydrogen and captured carbon, which would result in zero emissions.

Methane pyrolysis

Why is this an 'avoid-or-explain' technology?

This is a different approach to making hydrogen from natural gas (methane), which turns methane into hydrogen gas and solid carbon.[xxii] Unlike other natural gas-based hydrogen production methods, the carbon is not released into the atmosphere directly and does not need to be captured.

If the pyrolysis chamber were electrically heated , and powered by renewable sources, this could eliminate scope 1 and 2 emissions. However, upstream scope 3 emissions would remain from natural gas extraction.

Storing the solid carbon would result in no downstream scope 3 emissions, but as the profitability of methane pyrolysis would depend on the market for solid forms of carbon[3], this would likely be sold onto other industries – for example, to be turned into carbon black for use in rubber.[xxiii] If this happens, the fossil carbon will eventually be released. The market would not currently absorb the supply of solid carbon that would be created by methane pyrolysis at scale.[xxiv] If the market grew, this would worsen scope 3 emissions from methane pyrolysis.

What is the alternative?

Renewable hydrogen.

3 The form of solid carbon produced by methane pyrolysis will vary depending on reaction conditions. Some companies claim to be able to produce valuable carbon black, which has a high concentration of elemental carbon. Otherwise the reaction may produce carbon *soot* of a lower purity.

Biomass

Why is this an 'avoid-or-explain' material?

Biomass is used as an alternative to fossil fuels to produce energy (e.g burned for heat), or converted into feedstocks. Supporters of biomass argue that it can be emissions neutral because it is a regenerative resource (equivalent carbon that is emitted when biomass is used can be re-sequestered by growing new biomass) and can be farmed sustainably.

Biomass as an energy source:

Biomass should not be used as an energy source.[xxv] As a source of energy biomass can be more polluting than fossil fuels at the point of combustion. Woody biomass is less energy dense than coal so more of it has to be burned to produce an equivalent amount of energy, which results in higher CO2 emissions.

In practice it is difficult to re-sequester carbon from biomass at the same rate that it is released – it takes seconds to burn biomass, but years to grow it back. Land use for biomass can result in negative climate and biodiversity impacts, by damaging carbon sinks and forest ecosystems.[xxvi]

Biomass as a feedstock:

It is not straightforward to say products made with biomass feedstocks are low emissions or sustainable. This will depend on many factors, including the type of biomass, how it's cultivation and growth is managed, and the fate of the product it becomes.[xxvii]

Biomass will be in competition for land use with agriculture, and several industries may want biomass. This will make it difficult to produce biomass sustainably.

In 2023 ShareAction will publish a briefing on whether, and under what conditions, biomass should be used as a feedstock in the chemical sector.

What is the alternative?

Renewable hydrogen, carbon from other sources (see Section 2) and renewable energy.

Offsets

Why is this classified as 'avoid-or-explain'?

An offset is a reduction in emissions in one place to compensate for continuing emissions in another. Instead of emissions being eliminated, they are netted off elsewhere. Offsets can be purchased from a provider who will achieve the offset, such as forestation.

Offsetting is simply not a credible strategy to mitigate large amounts of emissions. For offsetting to truly net off emissions it needs to be an *additional* (the emissions reduction would not have occurred if not for the offsetting exercise) and *permanent* removal of carbon.[xxviii] This is difficult to verify and control over long periods of time. The number of trees that would need to be planted every year to mitigate even a small fraction of emissions from a single chemical company would be very high. It is also difficult to measure carbon removal accurately, and if carbon sequestration is overestimated then offsetting will not be effective.[xxix] Offsetting programs may issue credits for carbon offset, and there is a risk of double issuance, say, to two companies for the same unit of carbon removal.[xxx]

What is the alternative?

Companies have to address the sources of their emissions, and publish credible transition plans to do so.

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ShareAction is a NGO working globally to define the highest standards for responsible investment and drive change until these standards are adopted worldwide. We mobilise investors to take action to improve labour standards, tackle climate change and address pressing global health issues. Over 15 years, ShareAction has used its powerful toolkit of research, corporate campaigns, policy advocacy and public mobilisation to drive responsibility into the heart of mainstream investment. Our vision is a world where the financial system serves our planet and its people.

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