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2 May 2023

Envisioning a Better Future

Change In Methodology: Focusing On Emissions

"*Everything will get cheaper except the price of CO2*".

Dr. Steve Howard,
Chief Sustainability Officer at Temasek

In this report, we update our Sep 2021 paper titled Integrating ESG Scores Into Valuations, where we introduced our internal proprietary data and methodology in detail. At that time, we assigned an equal weighting to each of E, S, and G pillars to derive an overall ESG score, which we integrated into valuations. At present, we believe the E pillar deserves greater weightage due to the impact emissions have on global warming. Therefore, from an equal weightage assigned to each of the three pillars, we now assign a 50% weight to the E pillar, and evenly divide the remainder (25% each) to the S and G pillars for the stocks under our coverage universe.

Emissions and atmospheric concentrations of greenhouse gases (GHG) are now at record highs, as concluded by members of the Intergovernmental Panel on Climate Change (IPCC) in its 36-page Synthesis Report, on 20 Mar.

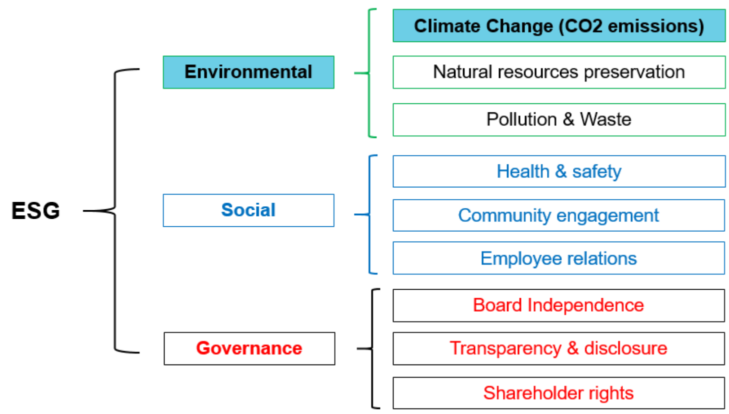
Net zero targets for countries imply reduced emissions for corporations. There will be costs involved to decrease the amount of carbon dioxide (CO2), with a material impact on companies' bottomlines. Several studies (see page 9) show that the companies that are successful in reducing emissions increase their value. Currently, several companies have issued their 2022 sustainability studies with a quantification of Scope 1, 2, or 3 emissions. Such data will become the norm in reports, and we will assess trends in emissions quantity from hereon.

"The polluter pays" principle means the cost per tonne of CO2 will increase. There is a growing consensus among governments, the financial community, and businesses on the fundamental role of carbon pricing in the transition to a decarbonized economy. Putting a price on carbon emissions is viewed as one of the most effective methods of tackling climate change. (See **Figure 7**).

Opportunities aplenty for investments in this transition to net zero economies (see page 10). In 2021, total investments into low-carbon energy transition worldwide was USD775bn. Also, the world is expected to invest c.USD90trn in infrastructure over the next 15 years. A 2023 report by the International Renewable Energy Agency (IRENE) on Malaysia's energy transition outlook estimates investments of c.USD415bn will be required by 2050.

Our ESG methodology, based on CFA Institute's research approach, is fleshed out through our proprietary score-card methodology (detailed on page 12). We maintain our ESG methodology of scoring the companies we cover, and integrating their overall ESG scores into our valuations. At the moment, the financial theory recommends no precise weighting given to each of the three categories of E, S, and G. Therefore, from an equal weightage assigned to each of the three pillars (as per our Sep 2021 report Integrating ESG Scores Into Valuations), going forward we will assign a 50% weightage to E and 25% each to the S and G pillars. We continue to look at the ESG holistically, but also recognise that the main contributor to global warming is emissions.

Figure 1: The three pillars and nine factors; our focus is on CO2 emissions



Source: RHB

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The greenhouse effect – CO2 traps heat, keeping the earth warm

Source: What is the Greenhouse effect;

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Why An Increased Focus On Emissions

Time for a rethink on the importance of emissions

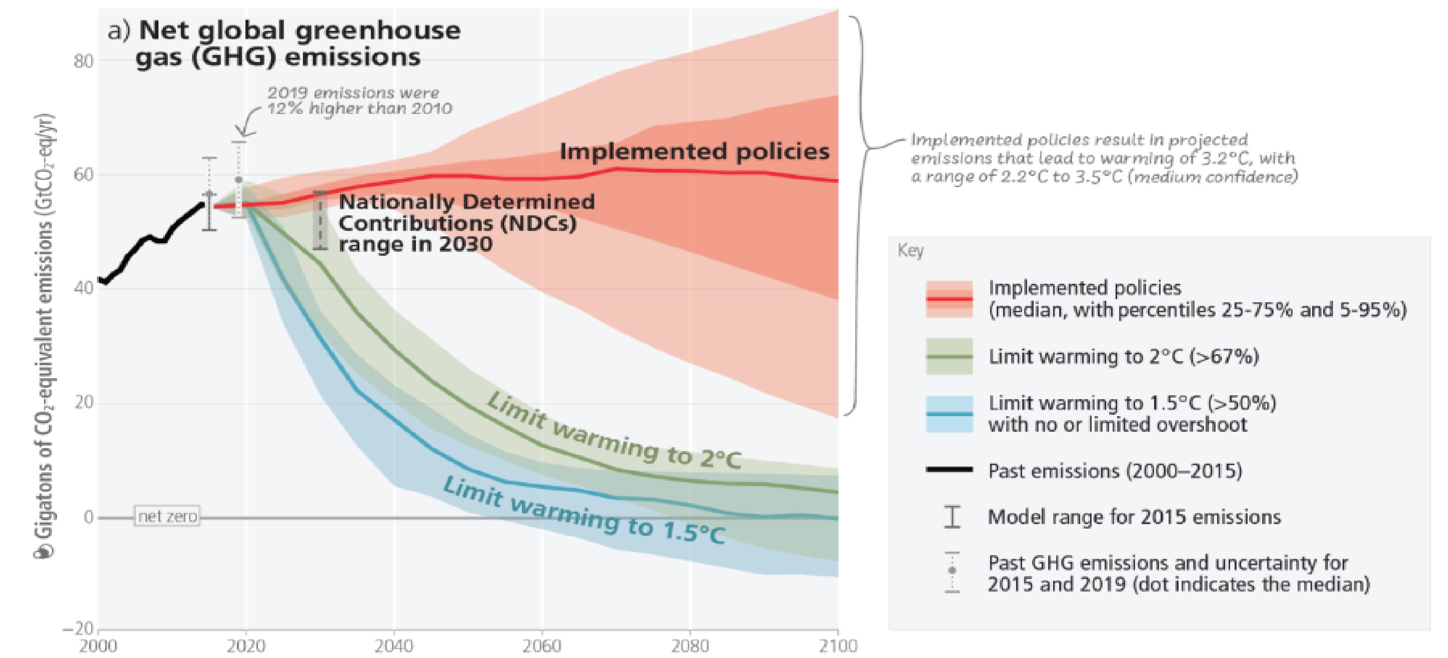
The increase in CO2 emissions resulted in climate change which, together with climate risk, has emerged as the most material ESG factor for institutional investors to address within their asset allocation strategies. Climate risk is both systemic and local. It threatens the financial system.

As a result, we increase our weightage for the Environmental (E) pillar to 50%, and split the remainder equally to assign 25% to Social and 25% to Governance. We undertook this re-balancing not because the S or G pillars are less important, but because E – and especially emissions – have become a crucial challenge for our planet.

On 20 Mar, members of the IPCC held a press conference and presented its 36-page Synthesis Report, badged as "a summary policymakers". The IPCC's assessments have been formally adopted by all governments of the world. This, in turn, will reverberate through the private sector and affect the decisions of boards of major companies and investment funds.

The Synthesis Report confirmed that both emissions and atmospheric concentrations of GHG are now at record highs. To keep warming within 2°C above pre-industrial levels, global GHG emissions must decline by c.21% by 2030 and c.35% by 2035. Keeping warming below 1.5°C requires an even stronger reduction in emissions. The conclusion of the IPCC report was clear: When it comes to climate change, the world is in dire straits, due to these increased emissions.

Figure 2: Limiting warming to 1.5°C and 2°C involves rapid, extensive and immediate GHG emission reductions



Source: 2023 IPCC Synthesis Report

During the press conference, Secretary-General of the United Nations (UN) Antonio Guterres, said, "This report is a clarion call to massively fast-track climate efforts by every country and every sector and on every timeframe. Our world needs climate action on all fronts: everything, everywhere, all at once."

Back in Aug 2021, Guterres also said, "The IPCC Climate Report is a Code Red for Humanity", based on the IPCC Working Group 1 report on the physical science basis of the sixth assessment.

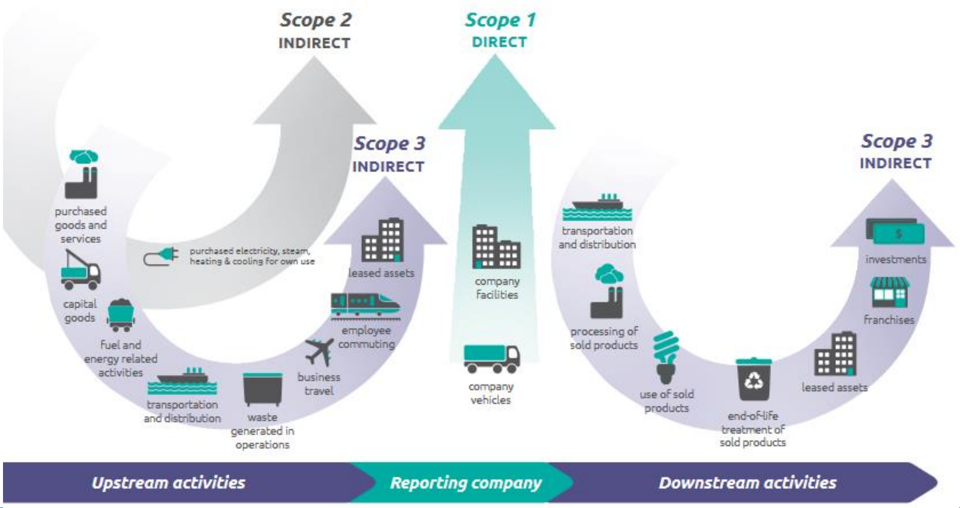
The UN press release stated: The alarm bells are deafening, and the evidence is irrefutable: GHG emissions from fossil-fuel burning and deforestation are choking our planet and putting billions of people at immediate risk

CO2 emissions in sustainability reports

According to a publication by Bursa Malaysia on 10 Feb, financial institutions in Malaysia are gearing up to make mandatory climate-related risk disclosures over the next two years. These would be supported by guidelines issued by the Joint Committee on Climate Change, which is co-chaired by representatives from Bank Negara Malaysia and the Securities Commission. The guidelines, designed to be aligned with the globally-accepted Task Force on Climate-related Financial Disclosures (TCFD) recommendations, now sets out best practices for the management of climate risk disclosures by banks, insurers, and *takaful* operators.

Among the recommended disclosures, the TCFD recommends that companies disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions, and the related risks.

Figure 3: GHG protocol scopes and emissions across the value chain



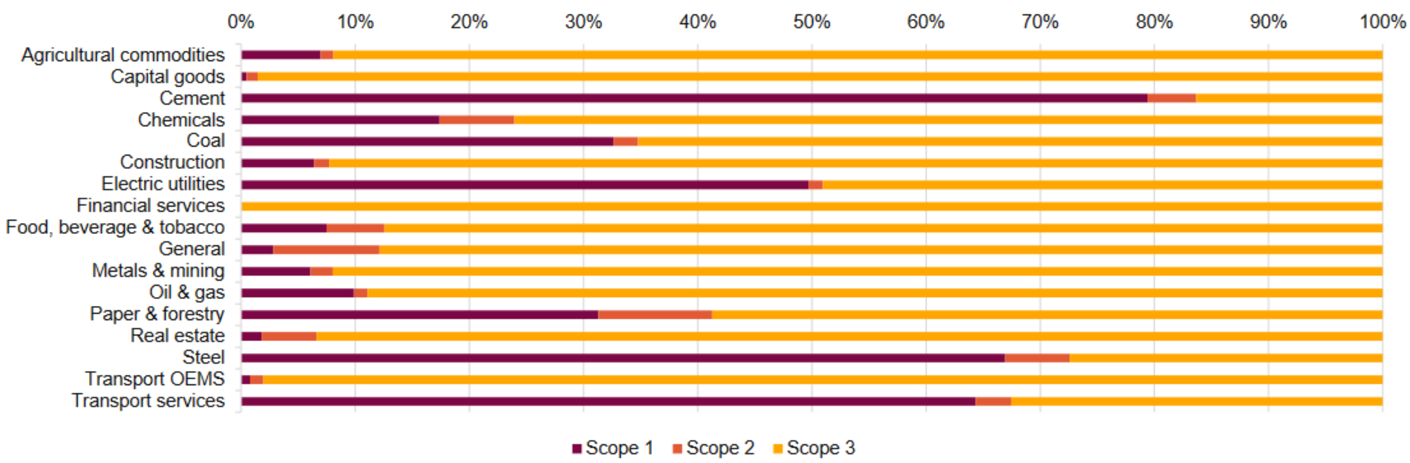
Source: Greenhouse Gas Protocol

- Scope 1 direct emissions are those emissions owned or controlled by the company
- Scope 2 are indirect emissions through electricity purchased (electricity used by the company)
- Scope 3 are other indirect emissions as a result of the company's business activities (not owned or controlled by the company)

Scope 3 emissions often comprise the lion's share of corporate GHG emissions, as shown in Figure 4. For instance, the Scope 1 and 2 emissions of an oil & gas company are only a small proportion of its related emissions, whereas the consumption and combustion of their products contribute the most emissions. CDP (formerly Carbon Disclosure Project) estimates Scope 3 emissions account for 75% of related GHG emissions across all sectors, based on CDP response data. In 2022, CDP also reported that financed emissions are over 700 times more than operational emissions of the financial institutions.

There are signs that Scope 3 awareness is growing, however, as the number of net zero targets that include value chain emissions has by risen nearly 20% YoY according to the latest study by Climate Action 100+

Figure 4: Scope 1, 2 and 3 emissions by sector



Source: CDP Technical Note (revised as of 25 Jan 2023)

Putting a price on CO2 emissions

The "polluter pays" principle. There is a growing consensus among governments, the financial community, and businesses on the fundamental role of carbon pricing in the transition to a decarbonised economy. Putting a price on carbon emissions is viewed as one of the most effective methods of tackling climate change. This is often called the "polluter pays" principle.

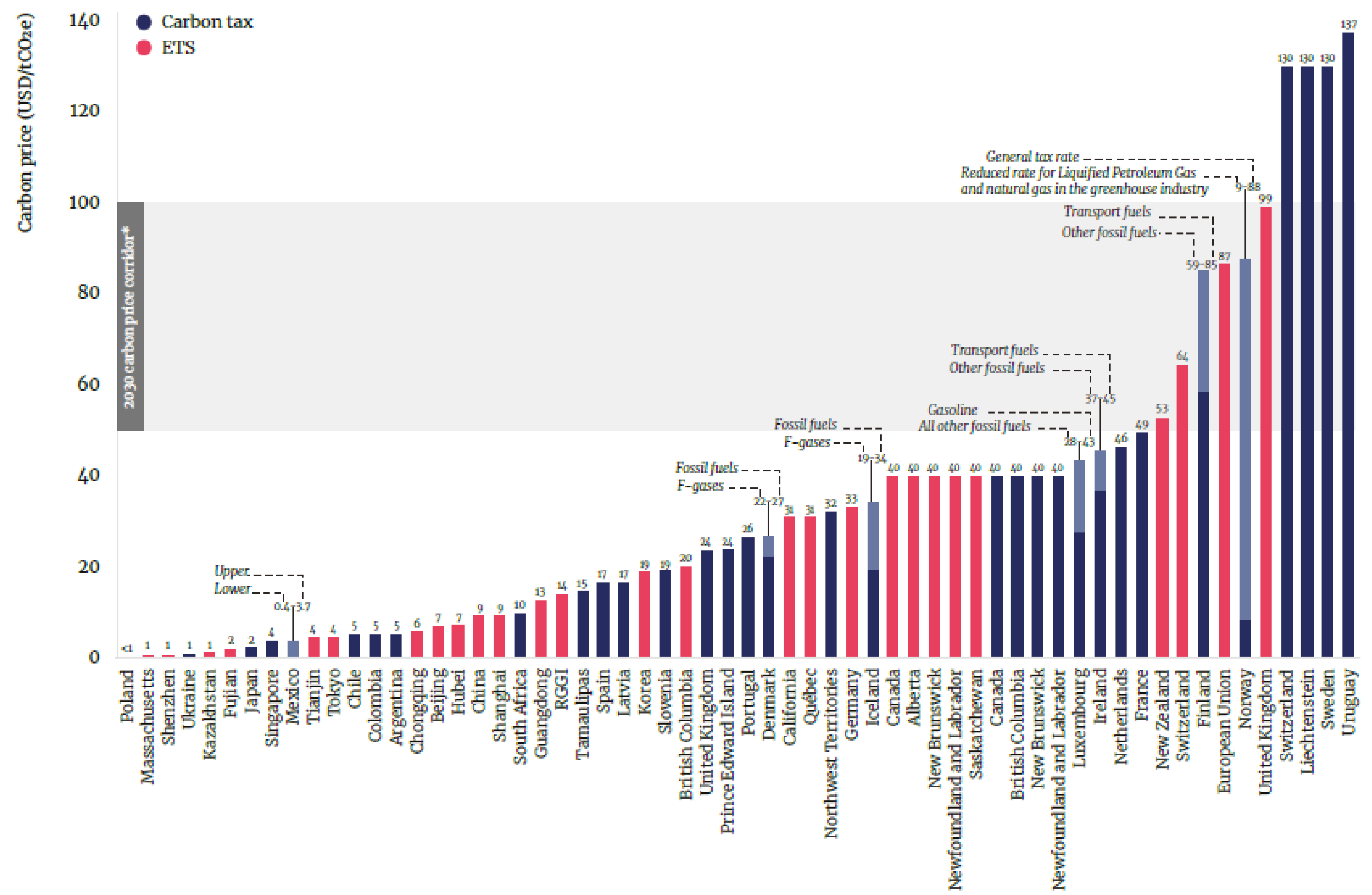
There are many types of carbon pricing. The two most common are:

i. The emission trading system;

ii. Carbon taxes, roughly corresponding to quotas and tariffs in international trade.

The graph below shows the wide range of carbon prices globally for both ETS and carbon taxes, as of Apr 2022.

Figure 5: Carbon pricing – ETS and carbon tax



Source: State and trends of Carbon Pricing as of Apr 2022

An Aug 2022 Bloomberg article stated that carbon prices in Asia are too cheap to help curb emissions. The conclusion was that emission prices and taxes are well below meaningful levels to affect polluter behaviour.

Emission trading system (ETS). An ETS is a system based on the exchange of permits for emission units, where actors that exceed their emission limits are required to buy permits from those that have emitted less. The overall quantity of emissions is fixed, and market mechanisms are used to set their price. In theory, this system creates an economic incentive for emission reductions to occur at the point of least cost. Rather than mandating similar levels of reductions for all actors, the price discovery helps reward those that can afford to reduce their emissions more. The effectiveness in practice, however, depends crucially on the design of the ETS.

If the scheme is too restrictive, it may encourage the offshoring of industries to jurisdictions with fewer constraints (a phenomenon known as "carbon leakage") and, as such, actually fail to reduce emissions.

As a result, free allocation of allowances (to give industry an initial "buffer") has been a widely used feature of ETSs, although in some cases, over-allocation resulted in the price of an emission unit being too low to properly incentivise decarbonisation.

The EU ETS is undergoing significant developments, including plans to establish a "carbon border adjustment mechanism" that will seek to level the playing field with imported goods that do not face similar carbon costs in the country of origin. As per the press release from Mar 2022 (link above), the Carbon Border Adjustment Mechanism (CBAM) targets imports of carbon-intensive products – in full compliance with international trade rules – to prevent offsetting the EU's greenhouse gas emissions reduction efforts through imports of products manufactured in non-EU countries, where climate change policies are less ambitious than in the EU. It will also help prevent the relocation of production or the import of carbon-intensive products. The products of the following sectors will be covered by CBAM: Cement, aluminium, fertilisers, electric energy production, iron and steel.

Bursa Malaysia Carbon Exchange's (BCX) first auction took place on 16 Mar with c.MYR7.7m in carbon credits sold. There is no domestic supply of carbon credits on BCX yet.

Carbon taxes. Carbon taxation entails directly setting an explicit price for GHG emissions (ex, per tonne of CO2). This has the advantage of predictability. In 2017, the Carbon Pricing Leadership Coalition estimated that an explicit global carbon price of USD40 to 80 per tCO2 in the 2020s, more than doubling to USD50 to 100 per tCO2 by 2030, is required to meet the goals of the Paris Agreement.

This price is substantially higher than the current global average price, which the International Monetary Fund has estimated at USD2.0 per tCO2.

The EU carbon price has been rising in recent years. Information in this table below from Oct 2022 is already outdated, as the price of carbon already exceeded EUR100 per tonne. This shows how fast this environment is shifting.

Figure 6: CO2 price in Europe

	2021	2022	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
European Union allowance (EUA) price forecast (EUR/t), nominal	53	80	70	72	76	84	96	106	116	127
EUA price forecast (EUR/t), real ('2021 EUR)		80	69	69	72	78	87	95	103	110
Change from previous forecast		-1	-10	-9	-7	-6	-4	-3	-3	-4

Source: Reuters (data as of Oct 2022)

Figure 7: The price of emissions allowances in the EU – cost per tonne of CO2 produced

Source: Carbon price tracker as of Jan 2023

- The cost of one tonne of CO2 is currently at EUR100, and is expected to increase
- Only in Oct 2022, the estimate for 2023 was EUR70/tCO2e. This shows how fast the price of CO2 emitted has increased

Revenues from CO2 emissions surged by 58% YoY. Overall, as of May 2022, according to a World Bank report there were 68 direct carbon pricing instruments operating: 32 ETSes and 36 carbon taxes, and these were responsible for raising USD84bn in revenues (from USD53bn in 2021), implying a 58% increase YoY.

This significant increase in revenue would be invested in communities and in supporting the low carbon transition.

The report found that only less than 4% of global emissions are currently covered by a direct carbon price in the range needed by 2030 to meet the temperature goal of the Paris Agreement.

Shadow (internal) carbon prices. Over the last 10 years, many companies – especially those in energy-intensive sectors – have used the practice of "shadow carbon pricing" to guide their decision-making process. An internal or shadow price on carbon creates a theoretical or assumed cost per tonne of carbon emissions. For example, the oil major BP uses a price assumption of a USD100/tCO2e by 2030 to better understand the potential impact of future climate regulation on the profitability of a project, a new business model, or an investment.

Its use reveals hidden risks and enables businesses to build this factor into future valuations and estimates of capital expenditure. In addition, when emissions bear a cost in profit-and-loss statements, it helps uncover inefficiencies and incentivise low-carbon innovation within departments, cutting a company's energy use and carbon pollution.

Recently, financial institutions have also begun using internal carbon pricing to assess their project portfolio. In 2019, approximately 1,600 companies – including more than 100 Fortune Global 500 companies, with a total annual revenue of c.USD7,000bn – reported that they are currently using an internal price on carbon, or plan to do so in the next two years

Dr Steve Howard, the Chief Sustainability Officer at Temasek, the Singapore Government's investment arm with over SGD380bn in assets famously stated "everything will get cheaper – except the price of carbon". At Temasek, the internal carbon price considered increased to USD50 per tonne (from USD42 per tonne) as of Jul 2022, and that price will increase every year towards USD100 per tonne by 2030.

Carbon offsetting. A concept that runs through different aspects of carbon markets is that of offsetting – the extent to which an activity providing an emission reduction in one part of the economy may be seen as compensating for the emission of GHG elsewhere.

The need for offsetting can be justified by the fact that, in a majority of scenarios compliant with the goals of the Paris Agreement, the world does not reach zero absolute GHG emissions in the next few decades – with some residual emissions being balanced out by natural or artificial "carbon sinks" (for instance tree planting). As such, companies or countries that are unable to reduce their emissions organically may require some accounting mechanism through which they can compensate those actors that are contributing negative emissions, in order for the global system to reach net zero.

However, there are substantial challenges around offsetting, because this market comprises both voluntary and regulated aspects, with uneven levels of transparency and scientific rigour. Part of the challenge stems from the counterfactual nature of offsetting and the risk of claiming credits for emission reductions that would have happened anyway, even if a given offset was not purchased (for example, compensating an owner to maintain a forest when the owner had no intention of cutting it down in the first place), or that has not happened yet (ie netting present emissions against the future carbon sequestered by a newly planted tree over its lifetime). Additional complexities stem from how to account for carbon credits across jurisdictions and over time (ie should overachievement in the past allow actors to reduce their emission targets in the future?).

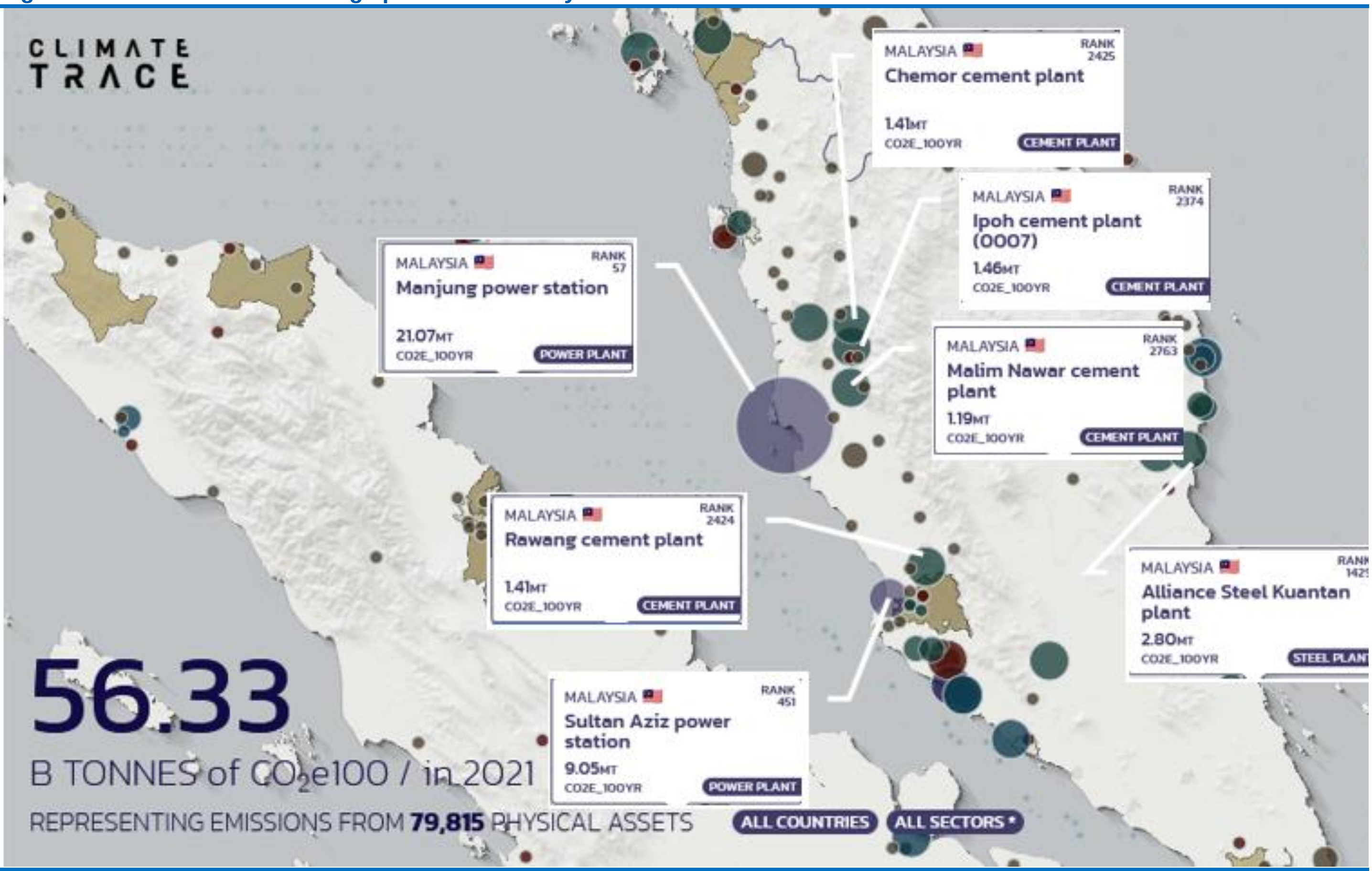
Carbon footprinting is one of the most common approaches used by companies. The use of carbon footprinting applies the international accounting tool of the GHG Protocol Standards. Scope 1 emissions are direct greenhouse emissions that occur from sources that are controlled or owned by an organisation (eg emissions associated with fuel combustion in furnaces or company vehicles). Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity. Scope 3 emissions cover all indirect emissions arising from the activities of an organisation. These include emissions from both suppliers and consumers (Figure 4**: Scope 1, 2 and 3 emissions by sector**).

The benefits of carbon footprinting include the potential to aggregate emissions across industries and value chains (for countries and portfolios, enabling comparisons among companies or portfolios) and across sectors and geographies, as well as to focus the analysis on emission intensity. We considered looking at a ratio of emissions intensity (for instance total emissions to total revenue or market cap), but decided to wait until it becomes mandatory for companies to report Scope 1, 2, and 3 emissions for a more complete picture.

Net Zero Targets For Malaysia And Companies

Malaysia towards net zero by 2050. In 2022, Malaysia emitted c.250 tonnes of CO_2e which represents c.0.69% share of the global GHG emissions of c.36,000 tonnes of CO_2e. At COP27, former US Vice President Al Gore launched the https://climatetrace.org/ database that provides emissions data, based on satellites measuring real emissions. It shows 56 tonnes (or 22% of the country's total) of CO_2e in 2021, representing emissions from c.79,800 physical assets.

Figure 8: Emissions data for large polluters in Malaysia



Source: Climate TRACE, RHB

In its 2022 annual report, Bank Negara Malaysia said that "*Malaysia targets to become a net zero greenhouse gas emissions nation as early as 2050*" and "carbon accounting is a critical enabler for transition. Measuring the amount of carbon dioxide (and its equivalent) emitted by businesses from direct (Scope 1) and indirect (Scope 2 and Scope 3) activities allows for credible monitoring, reporting and verification of GHG emissions." The report provides the paths to implement a national CO2 accounting framework.

Figure 9: Pre-conditions to implement a national carbon accounting framework

Legislation	Regulatory framework	Centralised online MRV system	Capacity building
Mandate carbon accounting and reporting of emissions in line with international frameworks	Clear guidelines and procedures detailing requirements for monitoring, reporting and verification	Facilitate data submission/collection, verification, monitoring and analysis	Knowledge and technical assistance for carbon accounting, measurement and reporting

Source: Bank Negara Malaysia

For financial institutions, mandatory disclosure based on TFCD recommendations will commence from 2024 onwards. Broader mandates that also include other entities to measure and disclose their carbon emissions would complement these efforts in ensuring that commitments are turned into action.

Companies in Malaysia are increasingly adopting net zero targets. We make the case that net zero targets (or becoming "carbon-neutral") make sense more at a country level, instead of a corporate level. Nevertheless it will be worth monitoring the evolution of a company's Scope 1, 2, and 3 emissions over time which is exactly what we intend to do.

As an example, from its press release on 9 Mar, Pos Malaysia targets net zero carbon emissions by 2050.

For those companies that did not yet issue such specific targets, the fact that a company which operates in Malaysia (a country committed to becoming a carbon-neutral nation by 2050), it is implied such a company also has to conform to carbon neutrality by or before 2050.

However, there is a significant variation among these targets, because they can:

i. Cover different scopes of emissions (just operational, or Scope 1 and 2) or include some or all of the value chain (Scope 3) and different types of emissions (just carbon dioxide or all GHGs);

ii. Focus on differing or multiple time frames;

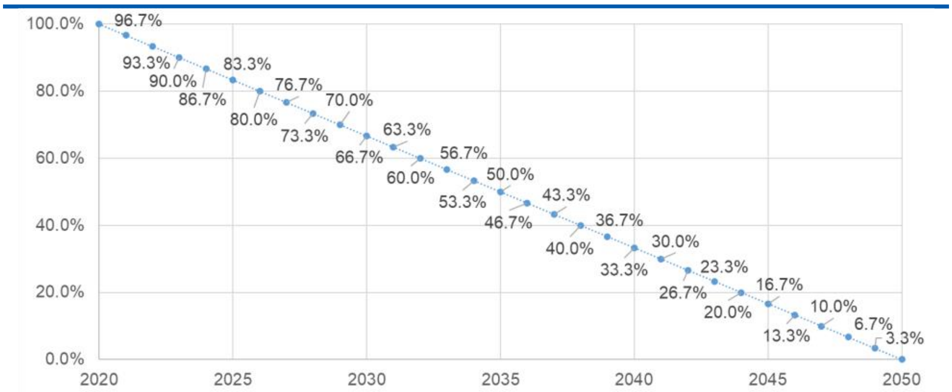
iii. Rely on offsets.

Emission trajectories

Emission trajectories can be used to assess the required reductions to reach a stated goal (for example, net zero carbon by 2050) and compare the pathways implied by corporate commitments, policies, or individual assets.

In a theoretical model where a company's emissions would have a linear decrease from 2020 to 2050, it means the particular company would have to reduce its emissions by 3.33% every year. While for the first years a company could purchase carbon offsets for the quantity of CO_2 to be reduced, eventually it would have to invest in a technology which would reduce emissions significantly. These are significant costs to be incurred in the future.

Figure 10: Trajectory to reach net zero emissions by 2050 (starting in 2020)



Source: RHB

- Assuming a linear decrease in emissions from 100% in 2020 down to 0% by 2050, each year a decrease of 3.33% should take place;
- This trajectory is not realistic, and is presented for informative purposes only

Emissions: Material Impact On Company Value

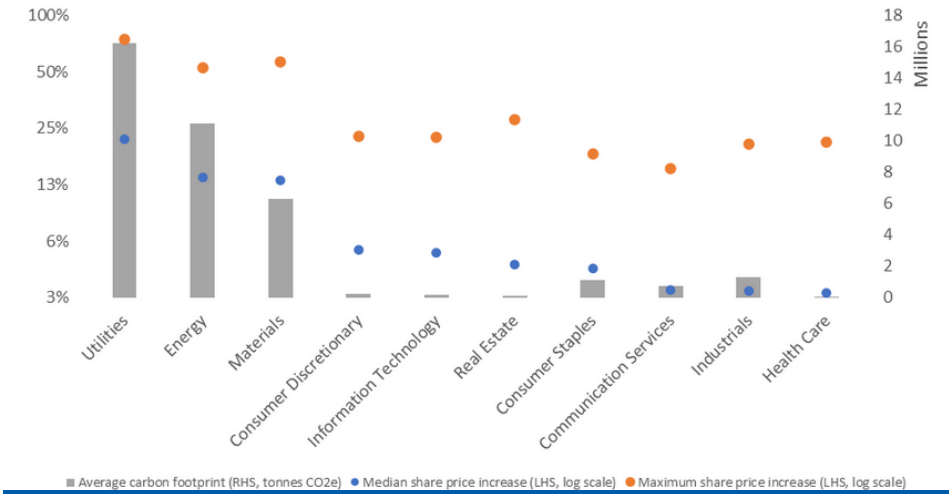
There are a multitude of academic and industry studies that show the material impact emissions have on the value of a company. We highlight a few below.

The Sustainability Accounting Standards Board (SASB) identifies financially material issues that are reasonably likely to impact the financial condition or operating performance of a company and, therefore, are most important to investors. The top of the list is GHG emissions, as these are assessed to be material for more than 50% of industries in such sectors as extractives and minerals processing and transportation, and for less than 50% of industries in such sectors as healthcare and technology and communications.

One initiative aims to identify the upside for large, listed companies if they were to bring their ESG performance in line with that of top-rated peers.

An article in ESG for Investors from Jan 2022 concludes that "reducing emissions can pay off."

Figure 11: All sectors stand to benefit from addressing emissions



Source: ESG for Investors – "Counting Down Carbon: Higher Share Prices through Lower Emissions" Jan 2022

- On average, companies could unlock up to a 3% share price increase across all sectors, with the potential for double-digit increases in high-emission sectors such as energy

Tackling the climate crisis could impact company value from -43% to +33%. A UN-backed investor network report has warned that policies to tackle the climate crisis will result in "dramatic changes" to the value of companies by 2025 – with the biggest polluters being the hardest hit and the greenest companies boosted. According to the forecast by the Principles for Responsible Investment (PRI) investor network, the 100 most carbon-intensive companies could stand to lose up to 43% of their value, while the 100 best performers will gain up to 33% of their value. Also, the best performing 10% of companies in the energy sector that invest heavily in renewable energy will see their valuations more than double, while the worst-performing 10%, with a minimal share of green minerals sales, could see their values halve. Car manufacturers with the highest level of investment in EVs could see their value increase by 108%.

The Street reacts negatively when a company invests in projects with high CO2 emissions is the conclusion of a paper entitled "Corporate carbon emissions and market valuation of organic and inorganic investments".

16% lower value for climate-change laggards. An assessment of the impact of climate change on the financial performance of South African companies found that the median market value to book value ratio of not leading climate-change performers was 16% lower vs that of leading climate-change performers.

Firm value decreases on average by USD212,000 for every 1,000 tonnes of CO2 produced by the firms is shown in a report by KPMG's Global Valuation Institute.

A company's ESG score does have a significant impact on its EV/EBITDA is the finding in a report by Deloitte entitled "Does a company's ESG score have a measurable impact on its market value?" which concludes that a 10pt higher ESG score is associated with an approximate 1.2x higher EV/EBITDA.

A 'good' company (ie highly environmentally friendly) would be worth roughly 50% more than a bad one with the same earnings finds Schroders,

Decreasing Emissions: Investment Opportunities

The increased awareness of climate change and environmental impact has resulted in an accelerating search for viable societal and economic solutions to enable a transition to a less carbon-intensive economy. Estimates for this transition reach trillions of dollars globally, and the magnitude of change will probably be universal across all aspects of life as we understand it today.

The world is expected to invest about USD90,000bn in infrastructure over the next 15 years – as per a 2016 study by the Global Commission on the Economy and Climate. This would necessitate an urgent shift to ensure that this capital is spent on low-carbon, energy-efficient projects. The report further described that "transformative change is needed now in how we build our cities, produce and use energy, transport people and goods, and manage our landscapes."

FTSE Russell estimated that the green economy (the total market capitalisation of the companies generating revenues from activities providing environmental benefits) in 2020 was equivalent to 5% of the total listed equity market. It has grown faster than the overall equity market since 2009, and is estimated to have overtaken the size of the oil & gas sector.

In 2021, total investments in the low-carbon energy transition worldwide was USD755bn, with China as the largest investor, followed by the United States according to BloombergNEF,

Malaysia's energy transition outlook. A 2023 report by the International Renewable Energy Agency (IRENA) on Malaysia's energy transition outlook estimates that investments totalling up to USD415bn will be required until 2050 in IRENA's 1.5-Scenario. Much of the additional investment (up to 40%) will be needed to build renewable power capacity, 33% will be in grids and flexibility, and the remainder will be distributed across end-use sectors to increase energy efficiency, scale up EV charging infrastructure and support green hydrogen.

Sustainable investment strategies will continue to deliver above-market returns. This conviction is backed by a meta-analysis from the NYU Stern Centre for Sustainable Business and Rockefeller Asset Management (study from 2021). The study found a positive correlation between ESG and the financial performance of both companies and investors in most of the 1,000 research papers published between 2015 and 2020.

Our most recent reports that feature opportunities and actionable ideas

In Feb 2023 we issued the ESG Diamonds In The Rough report where we highlighted several actionable ideas for the long term; the report also featured the very good results of our previous report from a year ago titled similarly ESG Diamonds In The Rough. In the same month, we published a thematic research report on solar energy, titled Solar Power: Greener Pastures For Green Energy

Prior to that, in Aug 2022, we highlighted that the capacity for renewable energy has been increasing, in our report ASEAN Renewable Energy – Weighting Climate Matters and in the same month we published Plantation: ESG Metrics Improved But Valuations Still Capped

In Jun 2022, we issued an Indonesia-specific thematic on the topic, titled Transition To Net Zero: Is Coal Still Gold?

In May 2022, we issued ASEAN Hospitals: ESG, Demographics, Defensiveness.

Methodology: Adjustments To Weightage

Our methodology is based on CFA Institute's research as of Jan 2023

Note that a contentious area is the definition of ESG itself. At the moment, there is no precise weightage given by CFA Institute to each of the three categories of E, S, and G.

On Oct 2020, we issued the Environmental, Social, And Governance report in which we introduced our ESG scoring for the companies in our coverage universe. We outlined nine ESG factors under the three pillars (**Figure 1**). Then, we ascribed equal weightage to each of the three pillars.

While the basis of our methodology has not changed, we have tweaked our weightage for the Environmental pillar to 50%, and assigned the remaining 25% each to the Social and Governance pillars.

We continue to look at the ESG holistically, but also closely examine the root cause of global warming – emissions. Therefore we maintain the definitions of each of the nine factors as used previously, but will focus more on emissions measured in CO2e.

Figure 12: Definitions of ESG pillars and factors

ESG pillar	What we look for
Environmental	**Composite of climate change, natural resources preservation, and pollution & waste**
Climate Change (CO_2 emissions)	Our aim is to establish a benchmark against which to measure future reductions. Emissions are usually referred to in terms of CO2 or simply "carbon'". Emissions are divided into: Direct emissions (the easiest to identify) and indirect emissions (which come from the energy a company buys and consumes, employees commuting, and business travel, etc.) We will try to assess the environmental impact of the company's products or services and evaluate policies implemented to manage the environmental performance of the company.
Natural resources preservation	Natural resources: Water waste, land use, and raw material sourcing are all commonly found in this category. Are there policies in place to ensure raw materials are extracted in an environmentally sensitive manner? Are firms taking proactive steps to use water more efficiently (in addition to straining community resources, water scarcity poses a huge challenge to businesses in industries from agriculture to textile manufacturing).
Pollution & Waste	Regarding the previous point, when a company uses water, does it leave it polluted or potable? This category looks at how a company deals with waste. Disposing of waste responsibly can prevent harmful substances from ending up in communities. This category rewards companies that take steps to mitigate pollution.
Social	**Composite of health & safety, community engagement, and employee relations**
Health & safety	Does the company aim to prevent workplace accidents, ensure the safety and health of employees, and form and promote a comfortable working environment?
Community engagement	We try to assess whether there is a mutually beneficial relationship between a business and the community, to combat issues of inequality. From customers to communities, this factor captures the quality and safety of products/services and level of customer satisfaction, as well as the access to products/services for all communities.
Employee relations	Here we try to assess labour relations, diversity and inclusion. We examine whether companies have policies in place to ensure that workers are treated fairly across the entire supply chain.
Governance	**Composite of board independence, transparency & disclosure, and shareholder rights**
Board Independence	Are at least 50% of the directors on the board independent, and who are the voices of the minority shareholders? We try to assess whether the independent directors are skilled, experienced, have no links to the company, and are able to step up when things go wrong.
Transparency & disclosure	Captures the level of transparency and disclosure of critical information about the business activities. We try to assess whether the company has a track record of providing timely, consistent and accurate information to shareholders and the public regarding its financial performance, liabilities, control and ownership, and corporate governance issues.
Shareholder rights	We analyse whether the company offers a toolkit of shareholder rights (eg having the right to speak at an AGM), whether a company address its shareholders' concerns, etc.
Overall ESG score	**As determined from our quantitative model**
	We assign scores from 1 (for poor) to 4 (for excellent) to the nine factors above, and calculate/quantify an overall ESG score. We further analyse the evolution of a company over time and its trajectory towards sustainability. We will try to see, for instance, how a low ESG score that does not improve over time may impact the company's profitability, capex, ROE and, ultimately, its EPS growth and TP.

Source: RHB

As was the case previously, in our methodology, we will continue to:

i. Identify ESG information for each company from the public sources (company disclosures/annual reports, site visits, industry trade organisations, ESG data providers, or media);

ii. Derive an overall ESG score from a low of 1 to a high of 4 for each company under coverage based on three factors for each of the pillars (as shown in **Figure 12**);

iii. From the scores derived for each E, S, and G pillars, we derive an overall ESG score and an ESG assessment. We also show in our reports the overall ratings per each pillar (from Weak to Excellent).

In our 23 Sep 2021 report on Integrating ESG Scores Into Valuations, we presented our methodology at the time, which consisted of:

i. Deriving a median ESG score per country, and comparing individual companies' scores against that median. Thereafter, we assign a premium or a discount to our valuation, based on the difference between the company's ESG score and that median.

ii. We also show the historical ESG score of the company under coverage in our reports, to show how it changes over time – which may also indicate its trajectory towards sustainability.

This is a sound approach. Our initial methodology of integrating ESG scores into valuations still holds, as we compared it with the approach suggested in the most recent research report from the CFA Institute on 6 Jan 2023, Guidance for Integrating ESG information into Equity Analysis and Research Reports.

This research report by the CFA Institute states the following:

ESG information can be integrated into investment analysis and valuation in different ways and to different extents. No standard approach exists for integrating ESG information, so analysts must decide for themselves what the best approach is based on how they typically analyse and value investments. According to the ESG Integration Framework, methods for integrating ESG information into security valuation include making adjustments to the following:

i. Forecasted financials;

ii. Forecasted financial ratios;

iii. Valuation multiples;

iv. Valuation model variables – (this is what we have been doing), further detailed in a case study #3 in CFA Institute's report – which shows the methodology we also employ – by assigning a premium/discount to the stock's intrinsic value;

v. In addition to multiplier models, ESG information can be integrated into other types of valuation models. An ESG score may be one factor of several that an analyst weighs in a valuation model. The amount of adjustment to the valuation model variables, such as the discount rate or constant growth rate, requires judgment on the part of the analyst. There are no common industry guidelines for making this determination.

vi. Security sensitivity and scenario analyses.

Implementation

In our initial ESG report from Oct 2020, we explained how we developed a scorecard based on the three pillars (E, S, and G) and nine factors.

We continue to look at the same three factors under the Environmental pillar: Climate change, preservation of natural resources, and pollution & waste. We quantify and assign scores on each factor and derive a score for the Environmental pillar which will have a 50% weight (from 33.3%) going forward, in our overall ESG score.

Currently, investors and regulators are already pushing firms to disclose details about their emissions. The more standardised this information gets (ie Scope 1, 2, or 3), the easier it will be to quantify them and assess which companies are CO2-emitting culprits, and which ones are doing the most to reduce emissions.

Figure 13: Environmental rating – an example of our scorecard methodology

			Weak (Low score)	Moderate (Medium score)	Good (High score)	Excellent (The highest score)
Environmental	A	Climate Change (CO_2 emissions)	**Hazardous** CO_2 emissions			Low CO_2 emissions
	B	Natural Resources preservation (use of water, biodversity and land use, raw material sourcing)	Does not capture the efficient use of natural resources			Captures the efficient use of natural resources
	C	Pollution & Waste (toxic emissions and waste, packaging material waste, electronic waste)	Hazardous pollution and waste			Does not pollute

Source: RHB

Analysis of CO2 emissions. Currently, among the top 2,000 companies of the world, little data is available on Scope 3 (as of 2018, 10% of companies reported Scope 3, and by 2020, this had increased to 18%), yet evidence indicates that Scope 3 makes up more than 50% of the world's carbon (and GHG equivalent) pollution impact.

It is important to note that the TCFD is a principles-based framework providing recommendations for assessing climate risk and exposure. Because it is not prescriptive, different approaches to measuring carbon intensity have developed. For example, while the EU's Sustainable Finance Disclosure Regulation accounts for Scope 1, 2, and 3 emissions, the UK TCFD practice currently focuses on only Scope 1 and Scope 2 emissions. Scope 3 emissions, which represent indirect emissions that occur within a company's value chain, are particularly difficult to measure because of the potential lack of data, transparency, and disclosure within the layers of a supply chain. As data and supply chain visibility improve, it is expected that emissions analysis will normalise to cover Scope 1, 2, and 3.

We took a look at a few examples, namely Top Glove, DBS Group, Bangkok Dusit Medical Services, and Bank Mandiri. Ultimately, determining a score for emissions that can be incorporated into our ESG scorecard is not an exact science. We realise this analysis has its limitations, as it is mostly backward-looking or static - yet, it offers us a way of assessing a company's trend for at least Scope 1 and 2 emissions. Going forward, we will include such information in our research reports. In our assessments of emissions, we will look at trends and whether companies are pledged to reduce emissions, by how much, and timing. Determining how the evolution of emissions will impact future cash flow is – yet again – not an exact science, but more of a matter of educated judgement.

We expect the disclosure of emissions to be influenced by company size therefore, due to company resources, small-cap players may not be able to present segregated emissions for a while.

Figure 14: Snapshot of Top Glove's emissions disclosure

		CO_{2eq} Emissions (metric ton)			
	Financial Year	FY2019	FY2020	FY2021	FY2022
Scope 1	Natural Gas	676,291	758,519	770,049	**583,896**
	Coal	34,853	0	20,538	**16,941**
	Petrol & Diesel*	N/A	N/A	N/A	**3,172**
	Fleet Vehicles*	N/A	N/A	N/A	**1,862**
	Sub Total	711,144	758,519	790,587	**605,871**
Scope 2	Purchased Electricity	243,790	269,636	286,646	**238,147**
	Sub Total	243,790	269,636	286,646	**238,147**
Total (Scope 1 & 2)		954,934	1,028,155	1,077,233	**844,018**
Intensity (MT/1,000 pcs of gloves)**		0.0179	0.0166	0.0167	**0.0195**
Scope 3	Business Travels	253	175	0.21	**339**
	Waste Generated in Operations*	N/A	N/A	N/A	**4,594**
	Employee Commuting*	N/A	N/A	N/A	**14,983**
	Sub Total	253	175	0.21	**19,916**
Grand Total (Scope 1, 2 & 3)		955,187	1,028,330	1,077,233	**863,934**

Source: Top Glove 2022 Sustainability Report

♦ Top Glove included data on Scope 1, 2, and 3 emissions in its FY22 (Jun) sustainability report, and revealed an overall downtrend in the past year.

Figure 15: Snapshot of Bangkok Dusit's emissions disclosure

Performance	Unit	2019	2020	2021	2022
Total GHG emissions (Scope 1 + 2)	Tons CO_2eq	109,173.75	104,150.45	104,610.25	242,540.83
Gross direct (Scope 1) GHG emissions	Tons CO_2eq	9,083.30	7,717.09	8,674.20	33,688.43
Total biogenic CO_2 emissions	Tons CO_2eq	0.00	0.00	0.00	475.15
Gross location-based energy indirect (Scope 2) GHG emissions	Tons CO_2eq	100,090.45	96,433.36	95,936.05	208,852.40

Source: Bangkok Dusit 2022 Sustainability Report

♦ Bangkok Dusit shared information on its Scope 1 and 2 emissions.

Figure 16: Snapshot of DBS's emissions disclosure

	2022							
	Singapore	Hong Kong	China	Taiwan	India	Indonesia	International Centres	Total
Carbon[5]								
1) Total carbon emissions without offsets (tCO_2e)[6] = [1a + 1b(ii) + 1c]	**30,673**	**1,925**	**1,366**	**481**	**3,831**	**2,566**	**727**	**41,569**
a) Scope 1 (tCO_2e)[7]	106	54	0	0	45	113	0	318
b) Scope 2 (tCO_2e)[8]								
i. Gross (location-based)	16,128	5,638	1,864	2,688	14,054	6,767	696	47,835
ii. Net (market-based)	16,128	0	0	0	0	0	696	16,824
c) Operational Scope 3 (tCO_2e)[9]	14,439	1,871	1,366	481	3,786	2,453	31	24,427
i. Data centres (tCO_2e)	9,175	1,400	984	459	1,778	2,048	0	15,844
ii. Storage facility energy (tCO_2e)	174	0	0	0	0	0	0	174
iii. Waste (tCO_2e)	245	206	24	22	37	28	0	562
iv. Business flights (tCO_2e)	3,785[10]	211	354	0	1,658	0	31	6,039
v. Ground transport (tCO_2e)	1,059	54	0	0	313	378	0	1,804
vi. Electric shuttlebus (tCO_2e)	0.5	0	3.5	0	0	0	0	4
2. Purchased carbon offsets (tCO_2e)								41,700
3. Total carbon equivalent net of carbon offsets purchased, market-based (tCO_2e) = [1a + 1b(ii) + 1c – 2]								-131

Source: DBS 2022 Sustainability Report

- DBS splits the data on Scope 1, 2, and 3 over its main markets.

Figure 17: Snapshot of Bank Mandiri's emissions disclosure

Source of emissions	Satuan Unit	2022	2021	2020	2019 *Baseline*
Scope 1 (Operational Vehicle & Diesel Generator)	$TonCO_2e$	42.698	64.319	61.105	75.640
Scope 2 (Electricity)	$TonCO_2e$	260.082	249.938	254.173	283.113
Scope 3 (Official travel)	$TonCO_2e$	1.007	1.278	1.323	4.110
Total GHG emissions	$TonCO_2e$	303.787	315.535	316.602	362.863

Source: 2022 Sustainability Report Bank Mandiri

- Bank Mandiri details its Scope 1, 2, and 3 emissions. For Scope 3 only official travel is included.

We will continue to be on the lookout for greenwashing, ie behaviour or activities that make people believe that a company is doing more to protect the environment than it really is. As such, greenwashing is more about conveying a false impression than providing misleading information.

Impact of this change in methodology on our ESG scores

Malaysia. We ran a simulation exercise on the impact of the change in weightage. Below, we show the companies with ESG scores that increased or decreased the most. Overall, the sum of all ESG scores of companies under our coverage in Malaysia decreased (at -5.85) which means the TPs of companies should be negatively impacted. The median for the country is still at 3.0 out of 4.0.

Figure 18: Malaysia – top/bottom seven with a positive/negative change in ESG score

Company	Ticker	E 33.33%	S 33.33%	G 33.33%	ESG	E 50.00%	S 25.00%	G 25.00%	ESG New score	Difference
CTOS Digital	CTOS MK	3.7	3.0	2.0	2.9	3.7	3.0	2.0	3.1	0.2
GHL Systems	GHLS MK	4.0	3.0	3.0	3.3	4.0	3.0	3.0	3.5	0.2
Cahya Mata Sarawak	CMS MK	3.0	2.7	1.3	2.3	3.0	2.7	1.3	2.5	0.2
Pintaras Jaya	PINT MK	3.3	2.7	2.3	2.8	3.3	2.7	2.3	2.9	0.1
UEM Edgenta	UEME MK	3.7	2.7	3.3	3.2	3.7	2.7	3.3	3.3	0.1
Solarvest	SOLAR MK	3.7	3.3	3.0	3.3	3.7	3.3	3.0	3.4	0.1
…										
Hibiscus Petroleum	HIBI MK	2.0	3.0	4.0	3.0	2.0	3.0	4.0	2.8	-0.2
MISC	MISC MK	2.0	3.3	3.7	3.0	2.0	3.3	3.7	2.8	-0.2
Tenaga Nasional	TNB MK	1.7	3.3	3.3	2.8	1.7	3.3	3.3	2.5	-0.3
Malaysia Marine & Heavy	MMHE MK	2.0	3.3	4.0	3.1	2.0	3.3	4.0	2.8	-0.3
Petronas Chemicals	PCHEM MK	2.0	3.3	4.0	3.1	2.0	3.3	4.0	2.8	-0.3
Petronas Dagangan	PETD MK	2.0	3.3	4.0	3.1	2.0	3.3	4.0	2.8	-0.3
Petronas Gas	PTG MK	1.7	3.3	4.0	3.0	1.7	3.3	4.0	2.7	-0.3
				Median	3.0			Median	3.0	Sum: -5.85

Source: RHB

Thailand. Similarly we show the companies in Thailand with ESG scores that increased or decreased the most. Overall, for our coverage, the sum of all ESG scores of companies in Thailand decreased (-4.76) which means the TPs of companies should be negatively impacted. The median for the country has decreased to 3.2, from 3.3 out of 4.0.

Figure 19: Thailand – top/bottom seven with a positive/negative change in ESG score

Company	Ticker	E 33.33%	S 33.33%	G 33.33%	ESG	E 50.00%	S 25.00%	G 25.00%	ESG New score	Difference
Thai Foods Group	TFG TB	3.7	2.7	3.6	3.3	3.7	2.7	3.6	3.4	0.1
Sino-Thai Engineering &	STEC TB	2.7	2.3	2.0	2.3	2.7	2.3	2.0	2.4	0.1
Asian Sea Corp	ASIAN TB	3.7	2.7	4.0	3.5	3.7	2.7	4.0	3.5	0.1
GFPT	GFPT TB	3.7	2.7	4.0	3.5	3.7	2.7	4.0	3.5	0.1
Thai Union Group	TU TB	3.7	2.7	4.0	3.5	3.7	2.7	4.0	3.5	0.1
Central Plaza Hotel	CENTEL TB	3.2	2.7	3.0	3.0	3.2	2.7	3.0	3.0	0.1
Thai Solar Energy	TSE TB	3.6	3.4	3.4	3.5	3.6	3.4	3.4	3.5	0.0
…										
Amata Corp	AMATA TB	2.3	2.7	4.0	3.0	2.3	2.7	4.0	2.8	-0.2
Krung Thai Bank	KTB TB	2.3	3.0	3.7	3.0	2.3	3.0	3.7	2.8	-0.2
PTT Exploration & Prod	PTTEP TB	2.7	3.7	4.0	3.5	2.7	3.7	4.0	3.3	-0.2
PTT Oil and Retail Busin	OR TB	2.7	3.7	4.0	3.5	2.7	3.7	4.0	3.3	-0.2
CH Karnchang	CK TB	2.0	2.3	4.0	2.8	2.0	2.3	4.0	2.6	-0.2
PTT Global Chemical	PTTGC TB	2.7	3.7	4.0	3.4	2.7	3.7	4.0	3.3	-0.2
Kiatnakin Phatra Financ	KKP TB	2.3	3.0	4.0	3.1	2.3	3.0	4.0	2.9	-0.2
				Median	3.3			Median	3.2	Sum: -4.76

Source: RHB

Singapore. Figure 20 details the companies in Singapore with ESG scores that increased or decreased the most. Overall, the sum of all ESG scores of companies under coverage in Singapore remained similar (a marginal 0.18 increase) which means the TPs of companies will not be impacted. Its country median remains at 3.0.

Figure 20: Singapore – top/bottom seven with a positive/negative change in ESG score

Company	Ticker	E 33.33%	S 33.33%	G 33.33%	ESG	E 50.00%	S 25.00%	G 25.00%	ESG New score	Difference
City Developments	CIT SP	4.0	3.7	2.3	3.3	4.0	3.7	2.3	3.5	0.2
Keppel REIT	KREIT SP	3.7	3.0	3.0	3.2	3.7	3.0	3.0	3.4	0.1
Kimly	KMLY SP	2.8	2.8	1.5	2.4	2.8	2.8	1.5	2.5	0.1
Capitaland Integrated C(	CICT SP	3.7	3.0	3.3	3.3	3.7	3.0	3.3	3.4	0.1
CapLand Ascendas REIT	CLAR SP	3.7	3.0	3.3	3.3	3.7	3.0	3.3	3.4	0.1
Riverstone	RSTON SP	3.0	2.3	3.0	2.8	3.0	2.3	3.0	2.8	0.1
CDL Hospitality Trusts	CDREIT SP	3.3	3.0	3.0	3.1	3.3	3.0	3.0	3.2	0.1
…										
AIMS APAC REIT	AAREIT SP	3.0	3.0	3.7	3.2	3.0	3.0	3.7	3.2	-0.1
StarHub	STH SP	3.0	3.0	3.7	3.2	3.0	3.0	3.7	3.2	-0.1
United Overseas Bank	UOB SP	3.0	3.0	3.7	3.2	3.0	3.0	3.7	3.2	-0.1
Singtel	ST SP	3.0	3.0	4.0	3.3	3.0	3.0	4.0	3.3	-0.1
China Aviation Oil	CAO SP	2.3	2.7	3.0	2.7	2.3	2.7	3.0	2.6	-0.1
ST Engineering	STE SP	3.0	3.7	3.7	3.4	3.0	3.7	3.7	3.3	-0.1
ComfortDelGro	CD SP	3.0	3.7	4.0	3.6	3.0	3.7	4.0	3.4	-0.1
				Median	**3.0**			**Median**	**3.0**	**Sum: 0.18**

Source: RHB

Indonesia. The table below shows the listed Indonesian players whose ESG scores have increased or decreased the most. For our Indonesian coverage universe, the sum of all ESG scores of companies decreased (-1.65), which means the TPs of companies should also decrease. The median for the country remains at 3.0.

Figure 21: Indonesia – top/bottom seven with a positive/negative change in ESG score

Company	Ticker	E 33.33%	S 33.33%	G 33.33%	ESG	E 50.00%	S 25.00%	G 25.00%	ESG New score	Difference
Indosat Ooredoo Hutchiso	ISAT IJ	3.3	2.7	2.3	2.77	3.3	2.7	2.3	2.90	0.1
Indofood CBP	ICBP IJ	3.3	3.0	2.3	2.87	3.3	3.0	2.3	2.98	0.1
Dayamitra Telekomunikasi	MTEL IJ	4.0	3.5	3.5	3.67	4.0	3.5	3.5	3.75	0.1
Kencana Energi Lestari	KEEN IJ	3.4	3.0	2.8	3.07	3.4	3.0	2.8	3.15	0.1
Astra Agro Lestari	AALI IJ	2.7	2.0	2.3	2.33	2.7	2.0	2.3	2.42	0.1
Summarecon Agung	SMRA IJ	3.2	3.2	2.5	2.97	3.2	3.2	2.5	3.03	0.1
Media Nusantara Citra	MNCN IJ	3.0	3.3	2.0	2.77	3.0	3.3	2.0	2.83	0.1
…										
Semen Indonesia	SMGR IJ	2.3	3.0	3.0	2.77	2.3	3.0	3.0	2.65	-0.1
Bank Negara Indonesia	BBNI IJ	2.7	3.0	4.0	3.23	2.7	3.0	4.0	3.10	-0.1
Bank Central Asia	BBCA IJ	2.7	3.3	4.0	3.33	2.7	3.3	4.0	3.18	-0.2
Adi Sarana Armada	ASSA IJ	2.3	3.3	3.3	2.97	2.3	3.3	3.3	2.80	-0.2
Bank Mandiri	BMRI IJ	2.3	3.0	3.7	3.00	2.3	3.0	3.7	2.83	-0.2
Blue Bird	BIRD IJ	2.3	3.3	3.7	3.10	2.3	3.3	3.7	2.90	-0.2
Hanjaya Mandala Sampoer	HMSP IJ	2.0	3.7	3.3	3.00	2.0	3.7	3.3	2.75	-0.2
				Median	**3.0**			**Median**	**3.0**	**Sum: -1.65**

Source: RHB

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