Corporate Emission Performance and the Use of Carbon Credits

This report was originally published by Trove Research on June 1, 2023

MSCI acquired Trove Research on Nov. 1, 2023

MSCI Carbon Markets

Trove Research

The Trove Intelligence platform provides investment-grade data and insights on corporate climate commitments and the voluntary carbon market

Trove Intelligence

✓ Online dashboards ✓ Weekly / monthly reports ✓ Research notes and webinars ✓ Ppt / Excel downloads ✓ Direct data feeds (/APIs) ✓ Access to analysts

Policy and guidance

- Analysis and consensus tracking on key policy & guidance updates across 180+ organizations
- 30 detailed country policy profiles
- Article 6 of the Paris Agreement and jurisdictional credit analysis

Carbon-credit projects and transactions

- 120+ fields for ~15k projects across 15+ registries
- Issuances/retirements by type, vintage, standard
- Performance metrics and compliance eligibility
- Developer profiles and investment tracking

Carbon-credit prices

- Weekly prices for exchange & OTC transactions
- Price tracking across project types, vintage year, country, credit quality, and additional attributes
- CDR transaction tracking
- Carbon credit price calculator

Corporate data

- >10k corporates' credit buying tracked & modelled
- Historic retirements analysed at project level
- Future demand modelled, segmented and costed
- Assessments of climate ambition & progress
- Templated outputs for regulatory disclosures

Carbon-credit integrity

- Consistent integrity assessment for >5k projects
- Covers all risks (additionality, quantification, permanence, co-benefits, and legal & ethical)
- Custom scoring based on user preferences
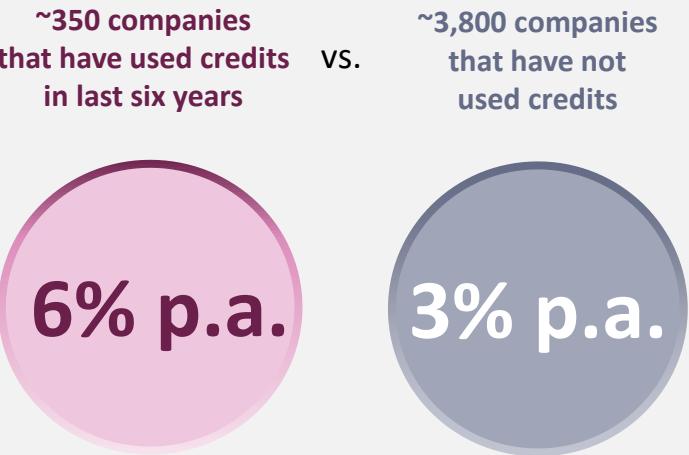- Robust, science-driven, CCP-aligned methodology

Forecasting

- Short-, medium- and long-term scenarios for voluntary carbon credit supply, demand & prices
- Covering reduction / removal / CORSIA credits
- Interactive scenario forecast model
- Development cost models, by project type

Product description as of 1 March 2024 (the time this report was migrated from www.trove-research.com to msci.com as part of MSCI's acquisition of Trove Research, now known as MSCI Carbon Markets).

Executive summary

Companies that are material users of carbon credits decarbonize twice as fast as those that do not use carbon credits

Median annual reduction in emissions 2017-2022

~350 companies that have used credits in last six years   VS.   **~3,800 companies that have not used credits**

6% p.a.   **3% p.a.**

Source: Trove Intelligence platform.
Notes: Above results based on a sample of 4,156 companies. 'Material' user of credits defined here as companies who have used at least 100 tCO$_2$e of credits and at least 5% of their Scope 1 and 2 emissions. Annualized emissions change shown for the full 2017-22 period used where disclosed; shorter time period is used where emissions not disclosed in earlier years. Companies whose emissions reduced by more than two standard deviations of the whole population median are excluded. Companies in the fossil fuel and power sectors are also excluded from the analysis as they often buy and retire carbon credits on behalf of customers.

Analysis findings

- The emissions performance of 4,156 companies over the last five years has been analyzed using emissions data from the Trove Intelligence platform.

- There is a clear and statistically significant trend for companies that use a 'material' amount of credits to reduce their emissions faster than those that do not, although there is a broad range of emissions performance within both groups.

- This trend for more rapid emission reductions among credit retirees holds across:
  - All time periods;
  - Nearly all sectors and regions;
  - All Scopes of emissions (including Scope 3);
  - Different thresholds for what's considered a 'material' use of credits;
  - Different aggregations of typical reductions (mean, median, range, etc.)

- 'Heavier' users of credits are found, on average, to be decarbonizing more quickly than 'lighter' users of credits.

- Users of higher integrity / higher priced credits are, on average, reducing their emissions more quickly than users of lower integrity / priced credits, although this trend is weaker than found elsewhere (e.g., for sectors or regions).

Implications

- These findings refute the assertion that companies voluntarily buying carbon credits are creating a 'license to pollute'.

- The evidence of the last five years strongly suggests that the voluntary purchase of carbon credits can provide companies an incentive to accelerate their emission reductions.

- This is likely, in part, to be because when purchasing credits, companies *voluntarily* attach a price to their emissions. This results in an annual cash expenditure in their budget, which companies then try to reduce. The opportunity to reduce costs then helps to strengthen internal business case(s) to reduce emissions in that firm's investment / budget approval processes.

- Firms engaging with credits are also likely to take their climate impact seriously and have well-developed mitigation and carbon-credit strategies.

- The analysis also suggests that, while it is important to drive up credit quality over time, credits can help companies today *both* mitigate their emissions impact and incentivize a reduction in their emissions.

Source: Trove Research (published 1 June 2023)

Table of contents

1. Data and Methodology

2. Analysis and results – all companies

3. Analysis and results – by region and sector

4. Analysis and results – types of credits used

Data and methodology

Data

Data has been sourced from Trove Research's database of corporate emissions and climate commitments covering over 10,000 firms

The database contains extensive emissions data for company-level emissions for Scopes 1, 2 and 3 for 2017-22. For the purposes of this analysis only Scopes 1 and 2 are analyzed. All data is cleaned, standardized and quality checked by the Trove team.

Where companies report combined Scope 1, 2 and 3 emissions, Trove estimates the split between Scopes 1, 2 and 3. Location-based Scope 2 emissions are used where both location- and market-based emissions are disclosed.

Credit 'usage' for each company is collected from three separate sources: (i) eight major carbon crediting registries (such as Verra and Gold Standard), (ii) the annual CDP survey, and (iii) directly from company reports, supplemented with Trove analysis.[1]

For this report we analyzed over 4,000 companies

The sample was selected by identifying the largest 350 corporate users of credits in the last six years, and then selecting control groups comprising approximately 10 times more companies from similar sectors / regions based on data availability.

Outliers with annual average emissions reductions of more than two standard deviations from the mean annual change in emissions were excluded from the analysis due to the likelihood their emissions changes could have been driven by changes in reporting methodology or corporate structure, such as acquisitions / divestments. Companies in the fossil-fuel and power sectors were also excluded from the analysis as these companies often buy and retire credits on behalf of customers through the selling of low carbon or carbon-neutral fuel and energy products. Our analysis of oil and gas companies shows no significant correlation on emissions performance between credit and non-credit users.

Methodology

Calculating annual changes in emissions

Each company's Scope 1 and 2 emissions change was calculated by taking the total change in emissions for the maximum time period data was available between 2017-22 and dividing it by the number of years for which data was available.

Alternative emissions change methodologies were also analyzed as sensitivities, including: (i) only analyzing companies whose emissions data was available for the whole 2017-22 period, (ii) taking the average of each year's change in emissions, and (iii) including Scope 3 emissions as well as Scope 1 and 2. In none of these alternative cases did the key conclusions of this report change.
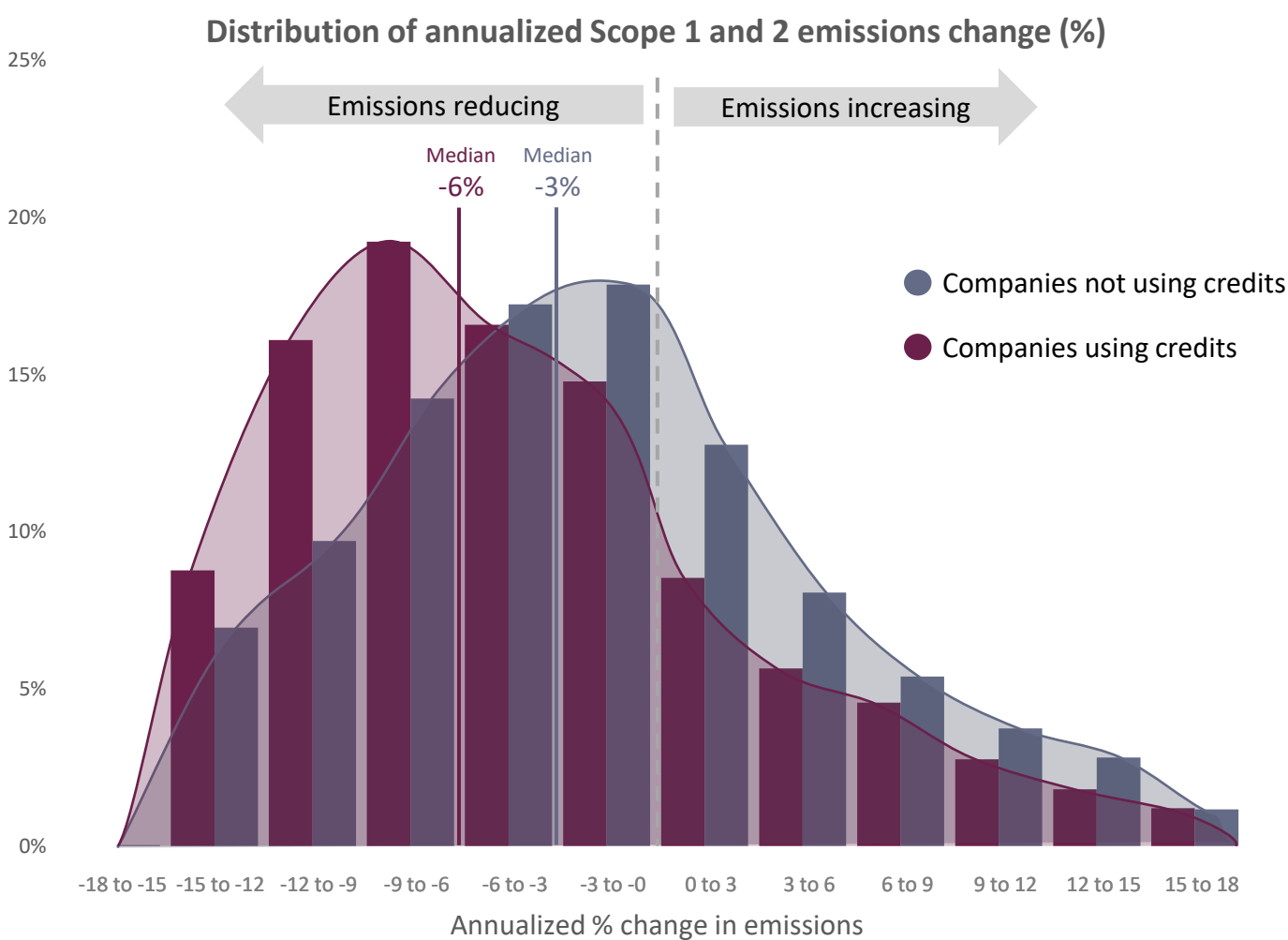
Defining and determining carbon-credit use

The analysis identifies 'material' corporate purchasers of carbon credits during 2017-2022 to avoid including firms that only bought an experimental volume of credits. Firms using an amount below the threshold were considered an 'insignificant' or 'non-' user of credits. Material users of credits are defined as companies that have used at least 100 tCO_2e of credits and at least 5% of their Scope 1 and 2 emissions during the period. These thresholds were varied by scenario and calculated on both an *absolute* basis (total number of credits) and a *relative* basis (credit use as % of Scope 1 and 2 emissions).

Statistical analysis

The emissions performance of different groups of companies (i.e., 'material' credit users vs non-users) were compared on both a mean and median basis. Statistical tests were conducted on the sample to assess significance (two sample T-tests with unequal variances).[2] In addition, key parameters values were adjusted one at a time, creating 120 different scenarios, the vast majority of which showed the same key findings.

1. Credits 'used' typically means 'retired' at the carbon-credit registry, however, some companies only disclose their purchase of credits rather than their retirements, and in these instances we use purchases – the combination of purchases and retirements is termed 'usage' in this report; 2. Two-Sample Assuming Unequal Variances One-Tail T-Tests were run for all scenarios. The Null Hypothesis (H0): The mean of 'non-users' is equal to or less than the mean of credit 'users' was rejected in most of the scenarios and the alternative hypothesis (Ha): The mean of 'mon-users' is greater than the mean of Credit 'users' was accepted.

Source: Trove Research (published 1 June 2023)

Results – annualized emission changes for companies using carbon credits

The median rate of emissions reductions among firms that voluntarily use 'material' quantities of carbon credits is roughly twice that of firms that do not use carbon credits.

Distribution of annualized Scope 1 and 2 emissions change (%)

Emissions reducing | Emissions increasing

Median -6% | Median -3%

● Companies not using credits
● Companies using credits

Annualized % change in emissions

X-axis: -18 to -15, -15 to -12, -12 to -9, -9 to -6, -6 to -3, -3 to -0, 0 to 3, 3 to 6, 6 to 9, 9 to 12, 12 to 15, 15 to 18

Data sample:

Includes largest circa 350 corporate users of credits in the last six years, and a similar sample of circa 10x more companies from similar sectors / regions in the non-users group.

Main scenario:

351 companies who have voluntarily used a 'material' number of credits are compared to 3,805 who haven't.

Compares annualized change in Scope 1 and 2 emissions.

Time period 2017 to 2022 (or as many years within that range that company has disclosed its emissions for).

Median annualized change in Scope 1 and 2 emissions:

Companies using credits: **6% p.a.** reduction.

Companies who are not: **3% p.a.** reduction.

Companies using credits are, on average, **decarbonizing approximately twice as fast** as their peers that are not.

In data presented above, 'material' user of credits defined as companies who have used at least 100 tCO2e of credits and at least 5% of their Scope 1 and 2 emissions. As per the following slide, the findings are not sensitive to the size of threshold chosen.

Source: Trove Research (published 1 June 2023)

Information Classification: GENERAL

Results – sensitivity analysis

We have tested the analysis across 120 different combinations of methodological assumptions. The conclusion that corporate climate performance is better for firms using carbon credits remains valid in nearly all sensitivities.

	Time period	Credit 'user' thresholds		Sample sizes		Median change in Scope 1 and 2 emissions per annum		Mean change in Scope 1 and 2 emissions per annum		
		Absolute (tCO$_2$e)	Relative (% Sc1+2)	'Non-users'	Credit 'users'	'Non-users'	Credit 'users'	'Non-users'	Credit 'users'	Statistical significance[3] @95% confidence
'Main' scenario[1]	17-22	≥100	≥5%	3,805	351	-2.9%	-6.0%	-2.4%	-4.5%	Y
Different time periods	17-21	≥100	≥5%	3,785	321	-3.0%	-5.9%	-2.4%	-4.5%	Y
	18-22	≥100	≥5%	3,739	323	-3.1%	-6.3%	-2.6%	-4.8%	Y
	18-21	≥100	≥5%	3,720	304	-3.2%	-6.4%	-2.6%	-4.7%	Y
	19-22	≥100	≥5%	3,262	273	-3.0%	-5.9%	-2.4%	-4.3%	Y
	17-19	≥100	≥5%	2,790	174	-1.5%	-2.8%	-0.9%	-1.7%	N
Incl. Scope 3	17-22	≥100	≥5%	2,393	164	-1.6%	-4.1%	-2.4%	-6.1%	Y
Different credit 'user' thresholds	17-22	>0	>0	3,327	829	-2.8%	-5.0%	-2.2%	-3.9%	Y
	17-22	≥1,000	≥20%	3,930	226	-3.1%	-6.3%	-2.4%	-4.6%	Y
	17-22	≥10,000	≥50%	4,042	114	-3.1%	-6.5%	-2.5%	-4.6%	Y

	Time period	Credit 'user' thresholds		Non-user	'Light'	'Heavy'	Non-user	'Light'	'Heavy'	Non-user	'Light'	'Heavy'	Statistical significance[3]
Non-users vs. 'light' vs. 'heavy' users[2]	17-22	≥100	≥5%	3,327	478	351	-2.2%	-3.5%	-4.5%	-2.8%	-4.3%	-6.0%	Y
	17-22	≥10,000	≥50%	3,327	715	114	-2.2%	-3.8%	-4.6%	-2.8%	-4.7%	-6.5%	Y

- The analysis was repeated 120 times using different analysis parameters, a sample of which is shown in the table to the left. T-tests were also run at a 95% confidence level to assess statistical significance of the results.

- Analyzing different time periods impacts the mean and median reductions, but always with an approximate doubling in the median reduction rate of credit users.

- Inclusion of Scope 3 displayed similar results over a slightly reduced sample set.

- Changing the threshold at which a company is classified as 'using' credits also had no impact on the finding that credit users typically reduce their emissions more quickly.

- 'Heavier' users of credits are decarbonizing more quickly than 'lighter' users of credits.

1. Main scenario is the scenario presented elsewhere in this report; 2. A non-user of credits is defined as a company that has made no known credit retirements or purchases in 2017-22, a 'heavy' user is defined as a company that has used or purchased a volume of credits above the thresholds shown, and a 'light' user is defined as a company that is known to have only used or purchased a volume of credits above zero but below the threshold amount during 2017-22;
3. Two-Sample Assuming Unequal Variances One-Tail t-Tests were run for all scenarios; H0: The mean of 'non-users' is equal to or less than the mean of Credit 'users'; Ha: The mean of 'Non-users' is greater than the mean of credit 'users'.

Source: Trove Research (published 1 June 2023)

Results – regional analysis

Across nearly all regions, material users of credits are, on average, decarbonizing more quickly than those that are not using credits. The exception is South America, where there is no statistical difference.

Legend:
- Companies not using credits
- Companies using credits
- ✕—✕ Mean
- —— Median

	Asia		Europe		North America		South America		TOTAL	
# Companies:	1,540	40	1,207	198	716	89	223	22	**3,805**	**351**
Median annual emission change	-2%	-5%	-4%	-7%	-4%	-6%	-2%	-2%	**-3%**	**-6%**
Mean annual emission change	-1%	-5%	-3%	-4%	-3%	-5%	-2%	-1%	**-2%**	**-4%**
Statistically significant @ 95% confidence	**Yes**		**Yes**		**Yes**		No		**Yes**	

- Across all major regions, companies that are significant users of carbon credits have reduced their emissions more quickly than companies that are not.

- The exception is South America where, among the 245 companies analyzed, there is no statistically significant difference in annual emissions performance between 'material' users of carbon credits and non-users.

- Among 1,580 firms in Asia, only 40 are classified as 'material' users of carbon credits. These 40 firms are, on average, reducing their Scope 1 and 2 emissions more than 1.3x faster than other Asian companies.

- Among 1,405 firms in Europe, 198 are classified as 'material' users of carbon credits, the most of any region in the world. These 198 firms are, on average, reducing their emissions circa 1.4x faster than the rest.

- Among 805 firms in North American, 89 are classified as 'material' users of credits. These are reducing their emissions circa 1.5x faster than the other North American firms.

Middle East region not shown given relatively small size. However, Middle Eastern-based firms are included in the global total. Material' user of credits defined here as companies who have used at least 100 tCO$_2$e of credits and at least 5% of their Scope 1 and 2 emissions. Annualized emissions change shown for the full 2017-22 period used where disclosed; shorter time period is used where emissions not disclosed in earlier years.

Source: Trove Research (published 1 June 2023)

Results – sectoral analysis

Across nearly all sectors, 'material' users of carbon credits are decarbonizing, on average, more quickly than those that are not, although this relationship is statistically significant only for the services, financial services and materials sectors given the small sample sizes elsewhere.

Legend: ● Companies not using credits ● Companies using credits ✕—✕ Mean — Median

	Manufacturing		Services		Financial services		Materials		Retail		Infrastructure		Food, beverage & agriculture		Transportation		Biotech, health care & pharma		Apparel		Hospitality		TOTAL	
# Companies:	1,056	32	555	83	442	112	464	12	283	29	273	25	237	16	175	16	170	17	79	7	71	2	**3,805**	**351**
Median annual emission change	-2%	-5%	-3%	-7%	-6%	-8%	-2%	-3%	-3%	-6%	-3%	-6%	-2%	-5%	-3%	-3%	-1%	-1%	-3%	0%	-5%	-6%	**-3%**	**-6%**
Mean annual emission change	-2%	-3%	-3%	-5%	-4%	-6%	-1%	-4%	-3%	-3%	-3%	-3%	-2%	-3%	-2%	-2%	-1%	-2%	-3%	-1%	-4%	-6%	**-2%**	**-4%**
Statistically significant @ 95% confidence	No		**Yes**		**Yes**		**Yes**		No		No		No		No		No		No		No		**Yes**	

'Material' user of credits defined here as companies who have used at least 100 tCO$_2$e of credits and at least 5% of their Scope 1 and 2 emissions. Annualized emissions change shown for the full 2017-22 period used where disclosed; shorter time period is used where emissions not disclosed in earlier years.

Information Classification: GENERAL

Source: Trove Research (published 1 June 2023)

Results – quality and price of carbon credits used

Companies using higher quality and more expensive carbon credits are reducing their emissions slightly faster than those using lower quality and cheaper credits.

Average price of credits used

Predicted price of credits retired by company[2]

Number of companies

Price band	Median annualized reduction	Number of companies
Over $9	7.0%	69
$6 - $9	5.4%	90
Under $6	6.2%	54
Undisclosed	5.7%	138
Not using credits	2.9%	3,805

0.0%   2.0%   4.0%   6.0%   8.0%

Median annualized reduction Scope 1 and 2 emissions 2017-22

Average integrity of credits used

Average Trove integrity score of credits retired[3]

Number of companies[1]

Integrity band	Median annualized reduction	Number of companies
More than 3.5	6.4%	21
3 - 3.5	6.3%	116
Less than 3	5.6%	73
Undisclosed	5.7%	138
Not using credits	2.9%	3,805

0.0%   2.0%   4.0%   6.0%   8.0%

Median annualized reduction Scope 1 and 2 emissions 2017-22

- 213 of the 350 companies that are classified as 'material' users of credits in this analysis disclose the exact credits they have retired.

- A predicted wholesale credit price using Trove's AI-driven Credit Price Calculator, and an average integrity score from Trove's Credit Integrity Assessment tool, can be matched to each of these retirements on the Trove Intelligence platform.

- Companies that, on average, buy the most expensive credits (i.e., those typically costing more than USD 9/tCO$_2$e) have a median emission reduction of **7.0%** per annum.

- This is higher than the **5.3%** and **5.9%** median reduction that retirees of credits averaging USD 6-9 and < USD6 in price achieve, which in turn are significantly higher than the just **2.9%** reduction achieved by non-users of credits.

- Similarly, companies whose Trove credit integrity scores higher than 3.0 on average in Trove's tool have a median emission reduction of **6.3-6.4%** p.a. This is higher than the **5.6%** median achieved by companies buying, on average, lower integrity credits.

1. Three companies excluded where retired credits are not yet covered by the Trove integrity assessments tool; 2. Historic prices are estimated using Trove's Carbon Price Calculator (CPC) tool. The calculator estimates prices via a machine learning algorithm that uses a multi variate time series regression on tens of thousands of prices in Trove's proprietary database covering exchange and over-the-counter settled transactions and asks. More detail on the methodology and sources can be provided upon request; 3. Scores are based on Trove's 'Balanced' weighting factors: 35% Additionality, 20% Quantification, 15% Permanence, 20% Co-benefits , 10% Legal and Ethical. More detail on Trove's integrity assessment methodology and sources can be provided upon request.

Source: Trove Research (published 1 June 2023)

Information Classification: GENERAL

Contact Us

AMERICAS		EUROPE, MIDDLE EAST & AFRICA		ASIA PACIFIC	
United States	+1 888 588 4567 *	South Africa	+ 27 21 673 0103	China	+ 86 21 61326611
Canada	+ 1 416 687 6270	Germany	+ 49 69 133 859 00	Hong Kong	+ 852 2844 9333
Brazil	+ 55 11 4040 7830	Switzerland	+ 41 22 817 9777	India	+ 91 22 6784 9160
Mexico	+ 52 81 1253 4020	United Kingdom	+ 44 20 7618 2222	Malaysia	1800818185 *
		Italy	+ 39 02 5849 0415	South Korea	+82 70 4769 4231
		France	+ 33 17 6769 810	Singapore	+65 67011177
				Australia	+612 9033 9333
				Taiwan	008 0112 7513*
				Thailand	0018 0015 6207 7181*
				Japan	+81 3 4579 0333

* = toll free
msci.com/contact-us

Notice and disclaimer