S&P Global
Ratings

How Environmental And Climate Risks And Opportunities Factor Into Global Corporate Ratings - An Update

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With climate change and severe weather events garnering rising numbers of headlines, lenders and institutional investors are increasingly interested in how S&P Global Ratings incorporates the risks and opportunities associated with environmental and climate (E&C) factors into its corporate credit ratings, and the impact these factors have had on our ratings. We've recently finished our second two-year review of E&C factors, which looks at how they affected corporate ratings between July 16, 2015, and Aug. 29. 2017. For that period, we've found 717 cases where E&C concerns were relevant to the rating, and 106 cases where E&C factors--both event-driven and those occurring over a longer time horizon--resulted in a change of rating, outlook, or a CreditWatch action. As in our previous review of E&C factors, the lion's share of affected ratings were in the oil refining and marketing industry, among regulated utilities, and in the unregulated power and gas subsector.

Watch the related CreditMatters TV segment titled "Environmental And Climate Risks And Opportunities Affect Corporate Credit Ratings"

We then took definitions of climate-related risk and opportunity set out by the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) in June 2017 and looked at how the 106 cases where E&C risks and opportunities have had a material impact on credit quality fit into the TCFD's definitions. We provide examples of this mapping exercise to provide further insight into our review.

Overview

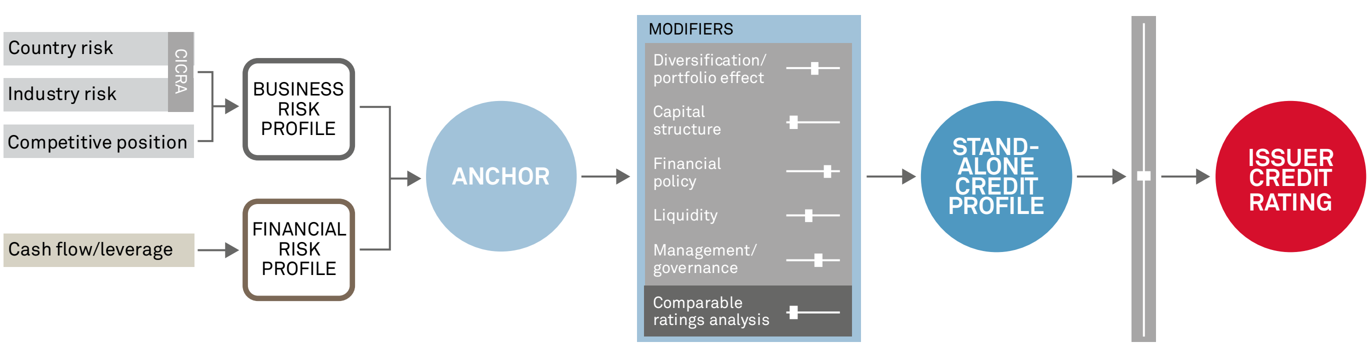
- We have reviewed the impact of environmental and climate (E&C) risks and opportunities on our corporate credit ratings for two years between mid-2015 and mid-2017.
- We found 717 ratings where E&C risks were an important factor in the analysis and 106 where those risks were key to a rating action.
- The affected ratings were overwhelmingly on issuers in the oil, gas, and power industries.
- To show the variety of E&C risks and opportunities in our corporate credit ratings, we have mapped material cases to the definitions set by the Financial Stability Board's Task Force on Climate-related Financial Disclosures.

E&C Risk And Rating Methodology

Our corporate analytical methodology incorporates various elements that, taken together, yield our rating on a given company (see chart 1). Our assessment of a corporate issuer's business risk profile combines our individual assessments of the company's industry risk, country risk, and competitive position, while our financial risk profile assessment reflects our cash flow/leverage analysis. We combine the issuer's business and financial risk profile assessments to determine its anchor. We apply additional factors--namely, diversification/portfolio effect, capital structure, financial policy, liquidity, management and governance, and the comparable ratings analysis—to modify the anchor.

Chart 1

Corporate Criteria Framework



Source: S&P Global Ratings.

Key credit factors

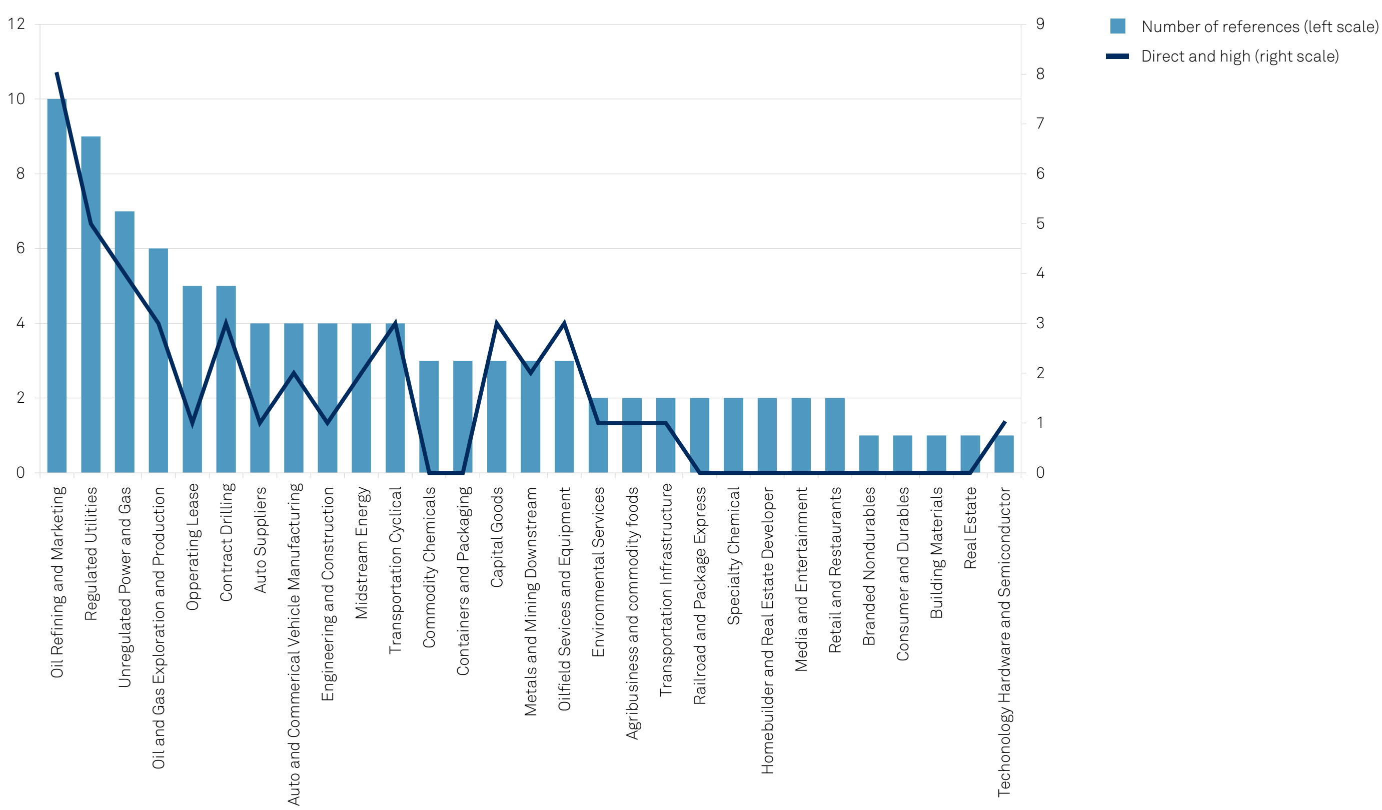
We also apply industry-specific criteria, which we refer to as key credit factors (KCFs), to complement our corporate methodology. The KCFs in rare circumstances may supersede certain sections of our broader corporate methodology. The KCFs provide complementary detail, such as how any industry-specific risk factors are assessed, and they are where E&C risk references predominantly appear. That usually happens within the industry risk and competitive position portions of the business risk profile assessment, and in the "management and governance" modifier. E&C risks factor most heavily into our criteria for the oil refining and marketing, regulated utilities, and unregulated power and gas industries, where environmental regulations and weather events tend to have a more direct impact on credit quality than in other sectors, although E&C risks factor into our criteria for most industries to some degree (see chart 2).

Our key credit factors (KCFs) complement our corporate methodology by detailing how we assess industry-specific risk factors, and are where E&C risk references predominantly appear

Since we published "How Environmental and Climate Risks Factor Into Global Corporate Credit Ratings" on Oct. 21, 2015, we have released one new KCF, which is for the operating lease industry. This new piece of criteria references environmental factors twice. The first concerns their ability to cause extra cost and early retirement, as demonstrated by regulations implemented in 2015 on railroad tank cars in the U.S. and Canada. The second reference recognizes that railcars that carry hazardous or environmentally damaging commodities are often vulnerable to environmental regulation. The KCF also focuses on fuel efficiency in three areas. These references are also connected to environmental concerns, but are less directly relevant to our analysis because many other factors can influence fuel efficiency. We view these references as of "low" relevance to E&C risk, because of multiple drivers, so we do not include the references in the measure of direct and high relevance represented by the blue line in chart 2 below.

Chart 2

Number Of E&C References In Key Credit Factor Articles And Their Impact And Relevance Per Industry



Source: S&P Global Ratings.

E&C risk in management and governance criteria

Our assessment of management and governance acts as a modifier in our corporate rating methodology and therefore can directly influence an issuer's credit rating. The modifier is an aggregation of our analysis of eight management and seven governance subfactors.

We incorporate our view of how a company's management deals with environmental and social risks into the "comprehensiveness of risk management standards and tolerances" subfactor, which is part of our general risk management analysis. That is because we believe that material unmanaged environmental and social risks can hurt a company's creditworthiness over the rating horizon.

Results Of Our Lookback Analysis

In our lookback analysis we reviewed our research updates to gauge where and how E&C factors have featured in S&P Global Ratings' corporate credit analysis. We publish an update whenever we assign, affirm, or change a rating. For this analysis, we considered actions where ratings were raised or lowered, outlooks were revised, or ratings were placed on CreditWatch (106 in total). We also considered ratings where E&C factors featured in the analysis but did not drive a rating action (611).

We published nearly 9,000 research updates from July 2015 to August 2017. Of the research updates published over this period, E&C factors were an important consideration in the analysis in 717 cases (whether a key driver of the rating or not), which works out at just under 10% of research updates. This is a significant percentage given the number of different risks that can have an impact on credit quality. Of the 717 references, 106 listed E&C risks or opportunities as one of the key reasons for the rating action. In a number of instances where E&C factors featured in the analysis, these factors were considered as longer-term risks, even if they were not a key driver of the particular rating action on that day.

Why It Is Difficult To Analyze Climate Risk

We looked for all forms of environmental and climate risk in this analysis, we made a conscious decision not to look for climate change risks specifically because of the difficultly of attributing any given weather event to climate change alone. We know that climate change will increase the incidence and severity of weather events, both chronic and acute, such as hurricanes and droughts. It's much more difficult, however, to know that climate change caused a specific weather event.

Using Hurricane Harvey as an example, we can't say that it wouldn't have happened without climate change. There is a chance that Harvey could have happened even if greenhouse gases were still at preindustrial levels. However, scientific probability states that if it did occur it would most likely have been at a smaller magnitude. In summary, climate change makes events like Hurricane Harvey significantly more likely to occur but they are not impossible without it.

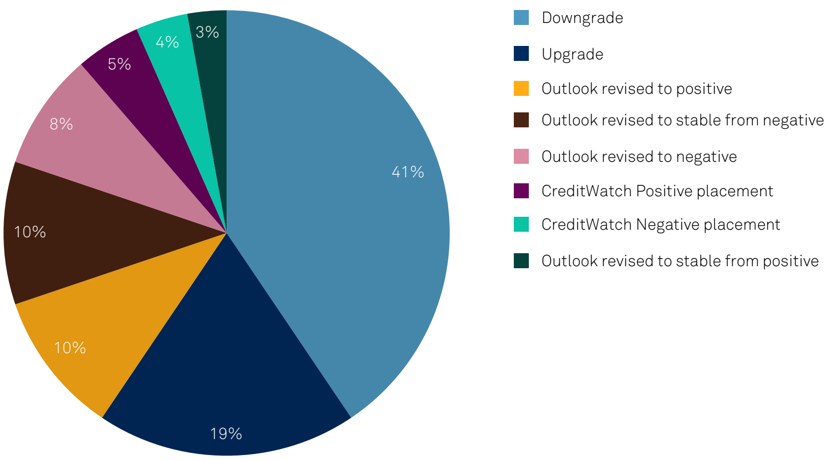
As climate change continues, it could potentially generate more E&C risks germane to our analyses.

Of these 106 research updates that listed a climate or environmental factor as a key driver to the rating change, 41% were downgrades (see chart 3). However, analyzing these results further we see that when grouping results into positive and negative rating actions, the outcomes are more balanced, with 44% being in the positive direction and 56% being in the negative direction (see table 1). This is a change from our first two-year lookback published in 2015, where 21% of E&C-driven actions resulted in a change in the positive direction and 79% resulted in a change in the negative direction. Although it's difficult to draw definitive conclusions on why this is, due to the sample size among other reasons, some potential contributory factors could be that more companies have mitigated E&C risks, or that more are benefiting from various transition opportunities or from changes in environmental policy.

Another difference between this lookback and our previous one is the increase in the number of research updates that feature E&C factors in their analysis (717 now versus 299 then), and the number of cases where an E&C factor was key to a rating action (106 now versus 56 then). We believe this difference could reflect, in part, more instances where E&C risk factors are proving to be material to credit quality. That can happen because of changes in environmental policies, or because of an increase in the frequency of severe weather events. The difference could also reflect the enhanced scope of our update.

Chart 3

Rating Actions Related To E&C Risk



Source: S&P Global Ratings.

Table 1

Rating Actions Where An E&C Factor Was Key

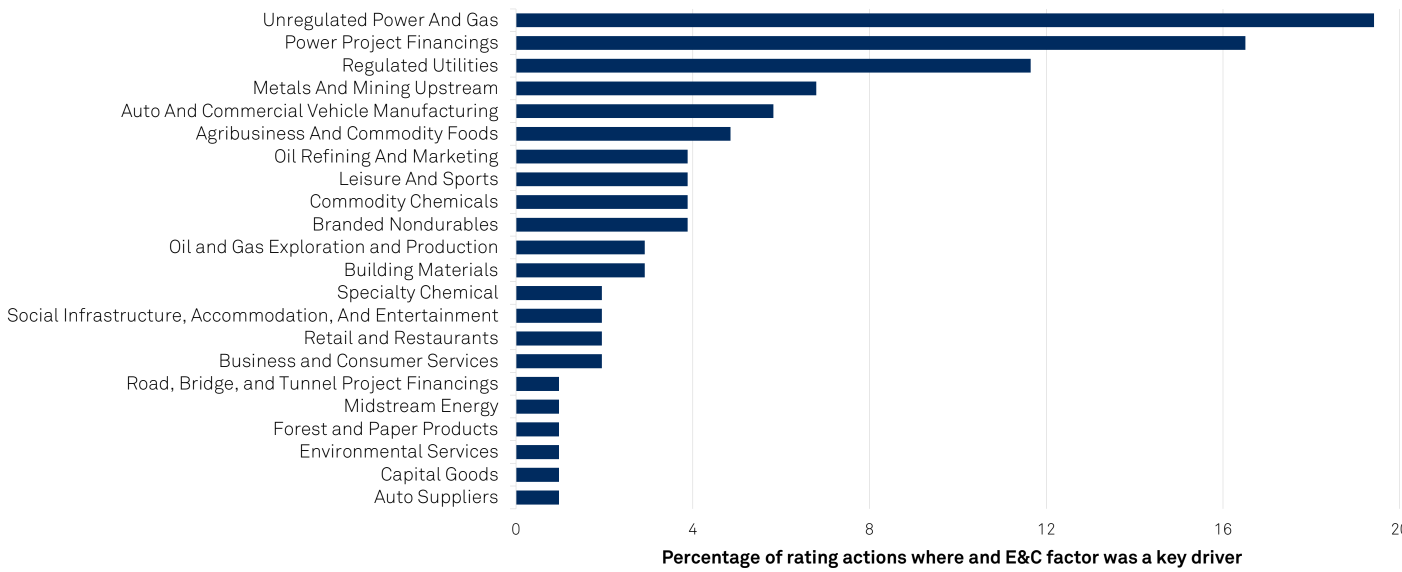
Positive rating actions		**Negative rating actions**	
CreditWatch Positive placement	5	CreditWatch Negative placement	4
Outlook Revised to positive	11	Outlook revised to negative	9
Outlook revised to stable from negative	11	Outlook revised to stable from positive	3
Upgrade	20	Downgrade	43
Total	47	Total	59
Percentage of total actions in the positive direction	44%	Percentage of total actions in the negative direction	56%

Source: S&P Global Ratings.

We then looked at the 106 results in terms of the KCFs referenced in each research update. Three cases referenced more than one KCF, and we excluded them from the analysis to avoid double counting results. Research updates using the unregulated power and gas, power project financing, and regulated utilities KCFs saw the highest number of rating changes as a result of E&C risks or opportunities (see chart 4). This is unsurprising given their exposure to environmental regulation and physical climate impacts. However, the diversity of KCFs referenced in the research updates that experienced rating changes due to E&C factors is testament to the wide-ranging impacts of E&C risks and opportunities in multiple sectors.

Chart 4

Rating Actions Related To E&C Risk By Referenced KCF

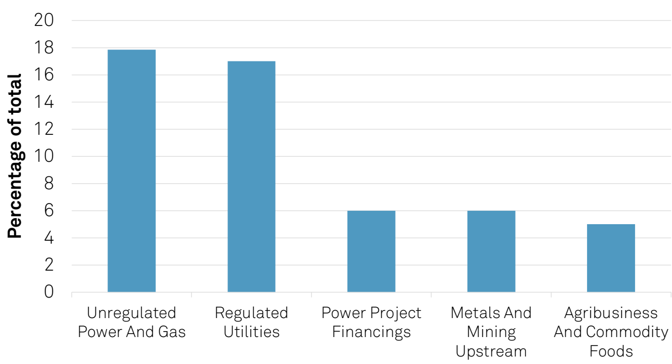


Source: S&P Global Ratings.

We then ran the same exercise on the wider pool of 717 research updates where E&C factors were considered in our credit analysis, regardless of whether they caused a rating change. We show the results from the top five KCFs in terms of references in charts 5 and 6. The most commonly cited KCFs remain largely constant between the two exercises. There is one notable difference, which is the drop of the "Auto And Commercial Vehicle Manufacturing Industry" KCF from fifth place in the analysis, looking at E&C factors as key drivers to rating changes, to eleventh place in the wider pool. This is because out of the 20 times an E&C factor was considered in the analysis of a research update that cited the "Auto And Commercial Vehicle Manufacturing Industry" KCF, six of these led to rating changes where the E&C factor was key. This is a large proportion of E&C-related rating changes compared to the other KCF groups. A large number of the six examples where an E&C factor was key related to the emissions scandals that have afflicted the auto industry over the past few years.

Chart 5

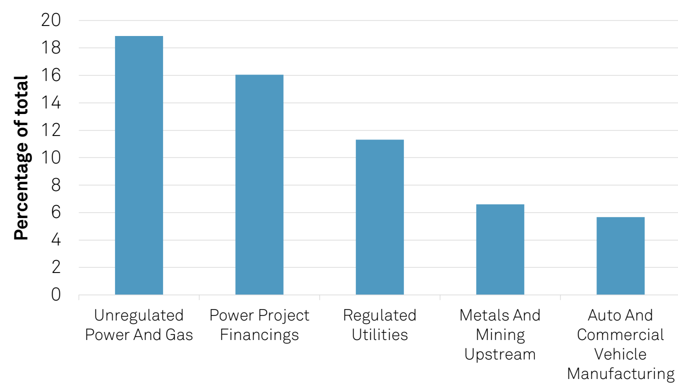
Most Frequently Cited KCF Where E&C Factors Were Considered In A Rating*



Source: S&P Global Ratings.

Chart 6

Most Frequently Cited KCF Where E&C Factors Were A Key Driver In A Rating Change*



Source: S&P Global Ratings.

*The wider analysis of all E&C related results had 16 research updates with more than one KCF referenced and 11 research updates with no KCF referenced. These were excluded for this exercise.

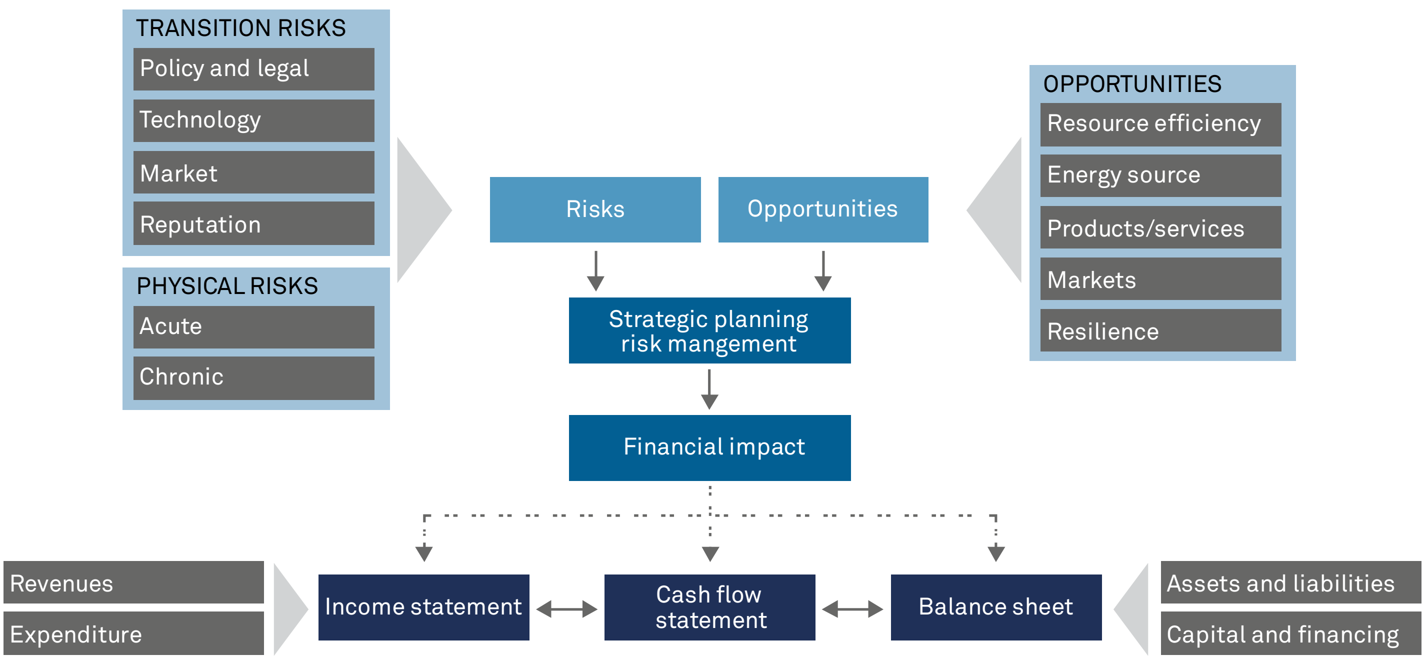
The Task Force On Climate-Related Financial Disclosures

On June 29, 2017, the TCFD, a group of industry experts commissioned by Mark Carney, Governor of the Bank of England, released a final report which outlined a set of recommendations for companies to produce climate-related financial risk disclosures. The aim is to provide information to investors, lenders, insurers, and other stakeholders. (See "How The Recommendations Of The Task Force On Climate-Related Financial Disclosures May Figure Into Our Ratings," published Aug. 16, 2017).

As part of its work, the TCFD defined categories of climate-related risks and opportunities (see chart 7). We believe these definitions help explain the diverse range of risks and opportunities that can be captured under the broad umbrella of climate and environmental factors. To show this, we have mapped the examples identified in our lookback analysis to the risk and opportunity groups defined by the TCFD.

Chart 7

Climate-Related Risks, Opportunities, And Financial Impact

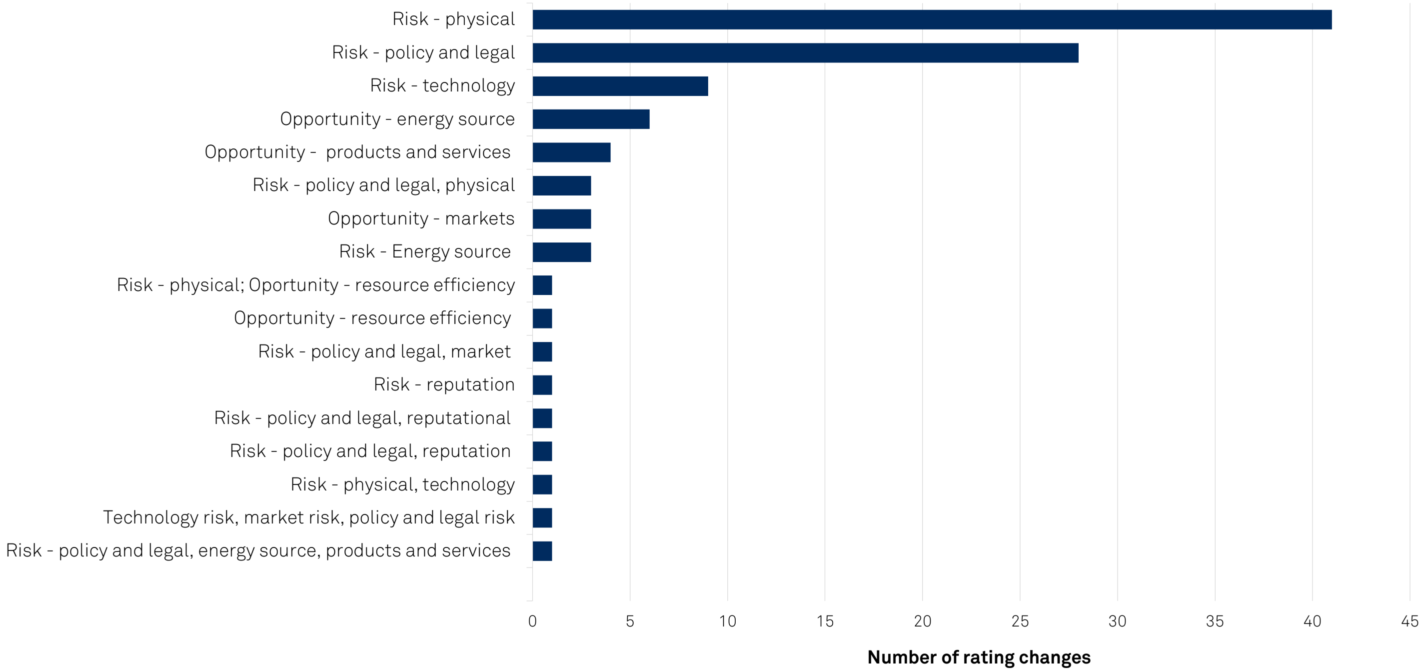


Source: TCFD Final Report, June 29th 2017.

Of the examples that had an environmental or climate factor that was key to a rating change, most fit into the TCFD's definition of physical risk (as shown in chart 8). The second most widely applicable category was policy and legal risk. A large number of the cases could fit into more than one TCFD risk or opportunity category. Volkswagen AG's October 2015 downgrade, for example, met the TCFD's definitions of "reputational risk" and also "policy and legal risk". This rating action is described in more detail in the case study section of this report.

Chart 8

Rating Changes Where An E&C Factor Is A Key Driver, By TCFD Risk Or Opportunity



Source: S&P Global Ratings.

TCFD Definitions And Case Studies

Physical, Acute, And Chronic Risks

The TCFD defines physical, acute, and chronic risks as follows:

Physical risk

Physical risks resulting from climate change can be event driven (acute) or longer-term shifts (chronic) in climate patterns. Physical risks may have financial implications for organizations, such as direct damage to assets and indirect impacts from supply chain disruption. Organizations' financial performance may also be affected by changes in water availability, sourcing, and quality; food security; and extreme temperature changes affecting organizations' premises, operations, supply chain, transport needs, and employee safety.

Acute risk

Acute physical risks refer to those that are event-driven, including increased severity of extreme weather events, such as cyclones, hurricanes, or floods.

Chronic risk

Chronic physical risks refer to longer-term shifts in climate patterns.

Case study: Aberdeen Roads (Finance) plc; Acute risk

- Date: Feb. 23, 2016
- Action: Outlook revised to negative
- Key Rationale: Construction delays following flooding, utility diversion delays, and uncertainty around the financial implications for the project.

Scotland-based limited-purpose entity Aberdeen Roads (Finance) Plc issued debt to finance the design, construction, and operation of the Aberdeen Western Peripheral Route in northern Scotland. Severe weather conditions lead to flooding of a large part of the construction site at the end of December 2015 and beginning of January 2016. The flooding, combined with a delay in completing a number of key utility diversions, contributed to construction delays. Project construction was behind schedule by several months, and at the time, we believed there was a chance that the contracting authority (CA) may not approve a revised construction schedule that was expected to be proposed by the AWPR Construction Joint Venture (CJV).

On Feb. 14, 2017, we lowered the Aberdeen Roads (Finance) plc rating to 'BBB+' from 'A-', and the project continued to experience severe construction delays. Although the project has largely been compensated for the flooding by insurance claims, it continued to experience significant construction delays, and its schedule slipped further in 2016. A revised construction schedule proposed by the AWPR CJV had, in February 2017, yet to be approved by the Aberdeen City Council, and we understood that resolution of contractual disputes had been slow. A breach of the project's contractual long-stop date could lead to an event of default under the project agreement and termination by the contracting authority.

Transition, Policy And Legal, Technology, Market, And Reputation Risks

The TCFD defines transition, policy and legal, technology, market, and reputation risks as follows:

Transition risk

Transitioning to a lower-carbon economy may entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change. Depending on the nature, speed, and focus of these changes, transition risks may pose varying levels of financial and reputational risk to organizations.

Policy and legal risk

Policy actions around climate change continue to evolve. The objectives generally fall into two categories--policy actions to constrain actions that contribute to climate change, or policy actions that promote adaptation to climate change. Some examples include implementing carbon-pricing mechanisms to reduce greenhouse gas emissions, shifting energy use toward lower emission sources, adopting energy-efficiency solutions, encouraging greater water efficiency measures, and promoting more sustainable land-use practices. The risk and financial impact of policy changes depend on their nature and timing.

Another important risk is litigation or legal risk. Recently, there has been an increase in climate-related litigation claims by property owners, municipalities, states, insurers, shareholders, and public interest organizations. Reasons for such litigation include the failure of organizations to mitigate impacts of climate change, failure to adapt to climate change, and the insufficiency of disclosure around material financial risks. As the value of loss and damage arising from climate change grows, litigation risk is also likely to increase.

Technology risk

Technological improvements or innovations that support the transition to a lower-carbon, energy-efficient economic system can have a significant impact on organizations. The development and use of emerging technologies such as renewable energy, battery storage, energy efficiency, and carbon capture and storage, will affect the competitiveness of certain organizations, their production and distribution costs, and ultimately the demand for their products and services. To the extent that new technology displaces old systems and disrupts some parts of the existing economic system, both winners and losers will emerge. The timing of technology development and deployment, however, is a key uncertainty in assessing technology risk.

Market risk

Although the ways in which markets can be affected by climate change are varied and complex, one of the major ways is through shifts in supply and demand for certain commodities, products, and services as climate-related risks and opportunities are increasingly taken into account.

Reputation risk

Climate change has been identified as a potential source of reputational risk tied to changing customer or community perceptions of an organization's contribution to or detraction from the transition to a lower-carbon economy. (See the TCFD's Final Report, June 29, 2017.)

Case study: Vattenfall AB; Transition risk, policy and legal risk

– Date: June 7, 2017
– Action: Outlook revised to stable from negative
– Key rationale: Improved business risk profile due to the sale of lignite assets, regulatory changes in Sweden and Germany around nuclear waste, and increased commissioned capacity from the expansion in wind production under different supportive subsidy schemes.

This year we revised the outlook on Vattenfall to stable from negative. The outlook revision was partly the result of the sale of the company's lignite assets. We deemed that the sale of the lignite assets, completed in September 2016, reduced the company's exposure to negative political intervention, merchant power prices, and carbon dioxide emissions, and transferred a large amount of asset-retirement obligations.

Case study: AgroFresh; Transition risk, market risk, and physical risk

– Date: June 10, 2016
– Action: Downgrade to 'B' from 'B+'
– Key rationale: Weaker-than-expected operating performance from exposure to adverse weather impacts on the apple crop

We downgraded AgroFresh, a U.S.-based company that uses SmartFresh--a technology that preserves fruits. Adverse weather conditions had been a primary driver of the weaker performance due to effects on the global apple crop, which drives an overwhelming majority of the company's revenues and EBITDA. Our assessment of a weak business risk profile took into account the risks related to AgroFresh's narrow focus, key patent expirations, and potential changes in consumer preferences. Although weather impacts on crop yield, competition, and patent expirations were the key to the rating change, we viewed the trend toward organic produce as a potential risk factor that could affect demand for fruits preserved with treatments like SmartFresh over the intermediate term. We view this as a transition risk as defined by the TCFD.

Case study: ExGen Texas Power LLC; Transition risk, technology risk

- Date: Jan. 13, 2016
- Action: Downgrade to 'B+' from 'BB-'
- Key rationale: Power prices in the Electric Reliability Council of Texas (ERCOT) had depressed during the previous year and were expected to remain depressed.

We downgraded ExGen Texas Power based in the U.S. The downgrade was due to ongoing low power prices in ERCOT, which reflect lower natural gas prices, sluggish growth in demand (based on a weaker oil and gas sector in Texas), and greater-than-expected renewable generation that has cut into peak demand and weakened market heat rates. Consecutive downgrades continued for ExGen with the most recent on March 16, 2017, when we lowered the rating to 'CCC-' in light of diminished market conditions. Here we view competition from greater-than-expected renewable generation as compatible with the TCFD's definition of technology risk.

Case study: Volkswagen AG; Transition risk, policy and legal risk, reputation risk

- Date: October 12, 2015
- Action: Downgrade to ‘A-/A-2’
- Key Rationale: Deficiencies in its management and governance and general risk management framework

We downgraded Volkswagen on Oct. 12, 2015, because we believed that the company had demonstrated material deficiencies in its management and governance, and general risk management framework. That led to wide-ranging negative credit consequences following the admission that the company installed software designed to manipulate diesel engine exhaust emissions in 11 million vehicles. Our assessment of VW's risk management framework included our view of VW's management of its material environmental and social risks. We believe that VW's breach of U.S. environmental law and potential other laws outside the U.S. represented a significant reputational and financial risk over the medium term. This rating action can be categorized under the TCFD's risk categories of 'policy and legal risk' and 'reputational risk'.

Climate-Related Opportunities

The TCFD defines climate-related opportunities, including resource efficiency, alternative energy sources, products and services, markets, and resilience, as follows:

Efforts to mitigate and adapt to climate change also produce opportunities for organizations, for example, through resource efficiency and cost savings, the adoption of low-emission energy sources, the development of new products and services, access to new markets, and building resilience along the supply chain. Climate-related opportunities will vary depending on the region, market, and industry in which an organization operates. TCFD identified the following areas of opportunity.

Resource efficiency

More and more organizations have successfully reduced operating costs by improving efficiency across their production and distribution processes, buildings, machinery, and transportation use. This is particularly the case in relation to energy efficiency, but also includes policies about material use, water use, and waste management. These initiatives can result in direct cost savings over the medium to long term and contribute to global efforts to curb emissions. Innovation in technology is assisting this transition. Such innovation includes efficient heating and circular economy solutions, advances in LED lighting and industrial motor technology, energy-efficient building retrofits, electric vehicles, geothermal power, and new water and sewage treatments.

Alternative energy sources

According to the International Energy Agency, to meet global emission-reduction goals, countries will need to transition a major percentage of their energy generation to low-emission alternatives such as wind, solar, wave, tidal, hydro, geothermal, nuclear, biofuels, and carbon capture and storage. For the fifth year in a row, investments in renewable energy capacity have exceeded investments in fossil fuel generation. The trend toward decentralized clean energy sources, rapidly declining costs, improved storage capabilities, and subsequent global adoption of these technologies are significant. Organizations that shift their energy usage toward low emission energy sources could save on annual energy costs.

Products and services

Organizations that innovate and develop new low-emission products and services may improve their competitive position and capitalize on shifting consumer and producer preferences. Some examples include consumer goods and services that place greater emphasis on a product's carbon footprint in its marketing and labeling (e.g., travel, food, beverage and consumer staples, mobility, printing, fashion, and recycling services) and producer goods that place emphasis on reducing emissions (e.g., adoption of energy-efficiency measures along the supply chain).

Markets

Organizations that pro-actively seek opportunities in new markets or types of assets may be able to diversify their activities and better position themselves for the transition to a lower-carbon economy. In particular, opportunities exist for organizations to access new markets through collaborating with governments, development banks, small-scale local entrepreneurs, and community groups in developed and developing countries as they work to shift to a lower-carbon economy. New opportunities can also be captured through underwriting or financing green bonds and infrastructure (e.g., low-emission energy production, energy efficiency, grid connectivity, or transport networks).

Resilience

The concept of climate resilience involves organizations developing the capacity to respond to climate change to better manage the associated risks and seize opportunities, including the ability to respond to transition and physical risks. Opportunities include improving efficiency, designing new production processes, and developing new products. Opportunities related to resilience may be especially relevant for organizations with long-lived fixed assets or extensive supply or distribution networks; those that depend critically on utility and infrastructure networks or natural resources in their value chain; and those that may require longer-term financing and investment. (See the TCFD's Final Report, June 29, 2017.)

Case study: Beijing Enterprises Holdings Ltd.; Climate-related opportunity, markets

– Date: March 16, 2017
– Action: Outlook revised to stable from negative.
– Key rationale: Stronger government support.

We revised the outlook on Beijing Enterprise Holdings (BEH) to stable from negative due to the increasing importance of the company to the Beijing municipal government. In our view, the importance of BJ Gas, BEH's fully owned subsidiary, as the sole natural gas supplier in Beijing has increased in line with the rising share of natural gas in Beijing's energy supply. At the time, we believed any credit distress or disruption in operations at BJ Gas could have resulted in severe economic loss or social disruption. BJ Gas' role in supplying clean energy has shot up as the municipality tackles protracted air pollution problems, which were a policy focus in the most recent five-year plan (2016-2020) set out by the government.

Case study: Darling Ingredients Inc; Climate-related opportunities, products, and services

– Date: Oct. 24, 2016
– Action: Outlook revised to stable from negative.
– Key rationale: The case has a number of key drivers, one of which was the expansion of lower carbon fuel standards.

The outlook revision in 2016 was due to the expected improvement in the company's EBITDA. This was the result of many factors, including the expected increase in dividends from the company's joint venture, Diamond Green Diesel. The joint venture is involved in biofuel sales, which were expected to benefit from the expansion of lower carbon fuel standards.

Case study: Albemarle Corp.; Climate-related opportunities, energy source

– Date: June 5, 2017
– Action: Upgrade to 'BBB' from 'BBB-'
– Key rationale: Improved credit metrics given organic earnings growth and substantial reduction in leverage. Expected ongoing improvement in the company's EBITDA in 2017 and 2018, reflecting the fast-growing lithium segment.

We upgraded Albemarle Corp., a Charlotte, N.C.-based specialty chemical company, to 'BBB' from 'BBB-'. The upgrade followed the company's outstanding operating performance in the booming lithium market, and its potential to become more profitable in the near future given the increasing demand for lithium batteries. We expect solid performance in 2017 and 2018, largely because of the company's lithium and advanced materials segment, whose sales grew 16% in 2016. We forecast that on a percentage basis, lithium sales will continue to grow at least twice as fast as GDP, thanks to growing uses in grid storage, portable electronics such as smartphones and tablets, and electric vehicles, which will represent significant growth opportunities. The company benefits from its No. 1 position in the lithium markets, representing about one-third of the industry.

Case study: West China Cement Ltd.; Climate-related opportunities, resource efficiency

- Date: March 22, 2017
- Action: Upgraded to 'B+'
- Key rationale: Improved liquidity and profitability due in part to resource efficiency.

In March 2017, we upgraded West China Cement due to liquidity and profitability improvements. The liquidity improvements were due to better-than-expected operating cash flows and refinancing of its debt. The profitability improvements were driven by cost-reduction efforts and better cement prices in the region. The cost-reduction efforts took the form of a waste heat recycling system that resulted in a 4.5% saving in electricity costs. We see this a resource efficiency opportunity under the TCFD's risk and opportunity definition.

Conclusion

We note the breadth of E&C risks and opportunities that have featured in our ratings over the past two years. Although it's difficult to draw concrete conclusions at this stage, the increase in positive rating actions could be a sign that corporates are beginning to benefit from transition opportunities and effectively manage some forms of E&C risk. However, the overall increase in the number of incidences where E&C factors feature in our analysis and where they are key drivers of rating actions (both positive and negative) could indicate that these issues are becoming increasingly important in terms of their impact on global corporate credit ratings. The TCFD's risk and opportunity definitions provide a useful lens through which we can analyze our credit ratings to see how and where this diverse set of risks and opportunities are factoring into our analysis. We will continue to maintain, monitor, and improve transparency on E&C factors in our credit ratings.

Criteria Review Methodology

Our industry-specific criteria (or KCFs) cover 40 corporate subsectors and four project finance subsectors and contain numerous E&C risk-related references, such as those related to weather, emissions, and natural disasters. Out of these references, we identified 99 as directly relevant to the way we consider E&C risk in our analysis.

For illustrative purposes, we further subdivided the 99 analytically pertinent references in our criteria in order to rank their credit relevance (whether high, medium, or low) and their impact (direct or indirect). We based our assessment of the relevance of a given E&C-related criteria reference on whether it would have a significant effect on a company's business or financial profile. For instance, references related to industries subject to environmental regulations and standards would likely have greater credit relevance than those related to companies and business lines that would only face disruptions to their business due to weather volatility.

We based our assessment of the relevance of a given E&C-related criteria reference on whether it would have a significant effect on a company's business or financial profile.

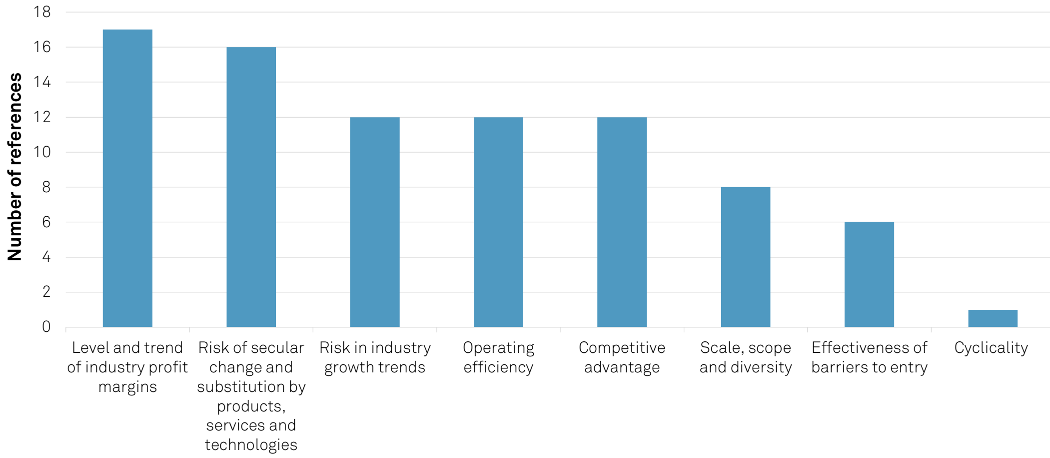
The assessment of impact reflects whether E&C risks have had a direct effect on a company's operations and profitability or an indirect effect through its upstream or downstream activities.

After assessing the relevance and impact of the 99 references in our KFCs, we ranked nearly two-thirds in the "high" relevance and "direct" impact categories (63 and 61 of the references, respectively), with the greatest numbers of "high" relevance and "direct" impact references related to the regulated utilities, oil refining and marketing, and unregulated power and gas industries.

We incorporate E&C risks primarily into our assessments of companies' business risk profiles, and they have the biggest influence on the industry risk and competitive factors aspects of this analysis. (See charts 9, 10, and 11 for the results of our methodology regarding business and environmental risk.) The impact of E&C-related opportunities, costs, and risks may also be factored into our financial forecasts.

Chart 9

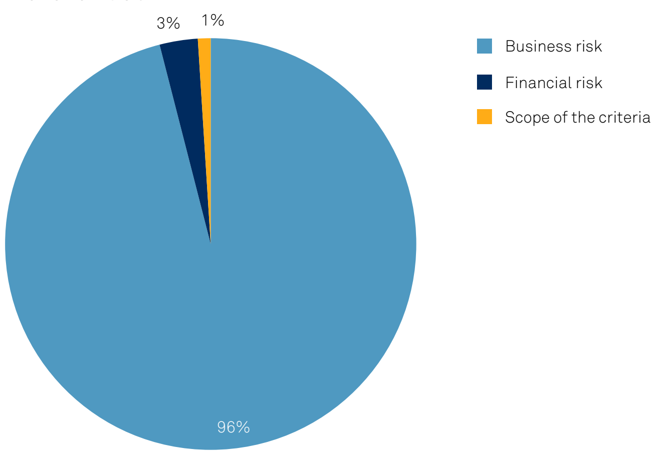
References Per Business Risk Determinants (Subsections)



Source: S&P Global Ratings.

Chart 10

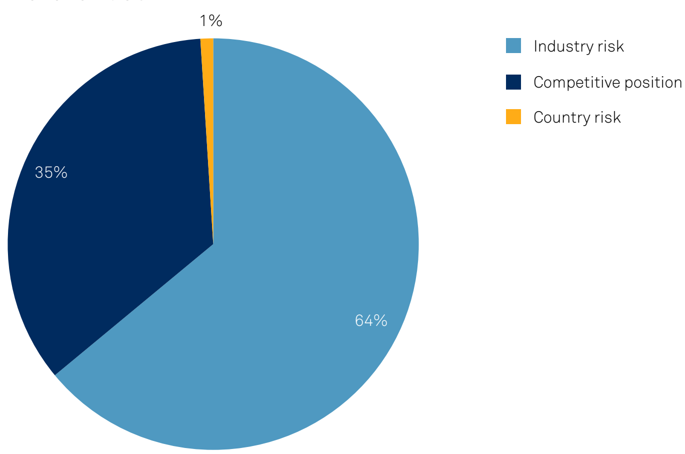
Section Of The Corporate Framework Where E&C Factor Is Referenced



Source: S&P Global Ratings.

Chart 11

Area Of Business Risk Profile Where E&C Factor Is Referenced



Source: S&P Global Ratings.

Lookback Analysis Methodology

The lookback analysis involved using the advanced search function on the Capital IQ platform to identify corporate research updates where particular words relating to E&C risk factors had been used. In cases where the research update related to a rating change (as opposed to a new rating assignment or a rating affirmation), an analyst determined whether the E&C factor had been a driver of the rating change by reviewing the research update.

Incidences where the search word was incorporated in a name (either of a company or a criteria document) but did not feature in the analysis, were excluded from our results. We also excluded results if the word being searched for was used in a context that did not qualify as an environmental or climate risk or opportunity consideration. We acknowledge that some incidences where E&C factors were incorporated into our ratings could have been missed using this approach, if the search words below did not feature in the research update. However, we believe that the 46 words that were used capture the vast majority of incidences where climate and environmental factors featured in our analysis.

Table 2

Search Words Used In Analysis

Keywords				
Acid	Smoke	Hydrological	Emission	Desert
Air quality	Spill	Hurricane	Environmental	Dioxide
Atmosphere	Storm	Methane	Ethanol	Disaster
Bio	Toxic	Ozone	Fire	Disease
Carbon	Typhoon	Pollution	Flood	Drought
Catastrophe	Warming	Radiation	Geo	
Clean	Waste	Recycle	Glacier	
Climate	Water	Renewable	Green	
CO2	Weather	Reusable	Habitat	
Contamination	Wild	Scarcity	Heat	

Related Criteria

- Key Credit Factors For The Unregulated Power And Gas Industry, March 28, 2014
- Key Credit Factors For The Oil Refining And Marketing Industry, March 27, 2014
- Corporate Methodology, Nov. 19, 2013
- Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- Management And Governance Credit Factors For Corporate Entities And Insurers, Nov. 13, 2012

Related Research

- How Quickly Utilities Adapt To Disruptive Factors Will Have An Increasing Impact On Their Credit Quality, Nov. 1, 2017
- Are Electric Cars And Charging Infrastructure Bright Spots For U.S. Regulated Utilities?, Sept. 12, 2017
- How The Recommendations Of The Task Force On Climate-Related Financial Disclosures May Figure Into Our Ratings, Aug. 16, 2017
- How Environmental And Climate Risks Factor Into Global Corporate Ratings, Oct. 21, 2015
- Climate Change Will Likely Test The Resilience Of Corporates' Creditworthiness To Natural Catastrophes, April 20, 2015

External Research:

- Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures, June 29, 2017

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Only a rating committee may determine a rating action and this report does not constitute a rating action.