

(MIS)CALCULATED RISK AND CLIMATE CHANGE

Are Rating Agencies Repeating
Credit Crisis Mistakes?

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“In the recent financial crisis, the ratings on structured financial products have proven to be inaccurate. This inaccuracy contributed significantly to the mismanagement of risks by financial institutions and investors, which in turn adversely impacted the health of the economy in the United States and around the world. Such inaccuracy necessitates increased accountability on the part of credit rating agencies.”

*Findings from the Dodd-Frank Wall Street Reform
and Consumer Protection Act of 2010.*

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Executive Summary

At present, if business-as-usual economic output continues, the global average temperature could increase by more than 4°C above pre-industrial levels by the year 2100—warmer than the earth has been in the past 14 million years. Economic output is driven by long- and short-term investment decisions, which are heavily informed by credit rating agencies and the important role that they play in global financial markets. Just as rating agencies failed to accurately rate credit and contributed to the credit crisis, now rating agencies may again be failing to accurately rate credit in the context of anthropogenic climate change.

Anthropogenic climate change associated with 4°C or greater warming (a “≥4°C climate scenario”) has disastrous impacts on the environment, people, and the global economy. However, this ≥4°C climate scenario is based on a business-as-usual climate change trajectory that may not continue. There is a growing trend in international, national, business, consumer, legal, regulatory, and social efforts to mitigate climate change. For instance, 193 nations have agreed to limit global warming below 2°C (a “2°C climate scenario”). Despite the movement away from business-as-usual, credit rating methodologies are not factoring in a dynamic climate change trajectory. Instead, they appear to assume a ≥4°C climate scenario. Assuming a ≥4°C climate scenario artificially inflates the credit ratings and financial value of companies causing global warming and could expose rating agencies themselves to legal liability.

The financial risks from a dynamic climate trajectory—both decreased fossil fuel demand under a 2°C climate scenario and climate impacts under both 2°C and ≥4°C climate scenarios—are not adequately expressed in the methodologies of rating



agencies. Indeed, the rating of a coal debt issuance in Australia in October 2014 provides an example of how one methodology, Moody’s generic project finance methodology, relies on a business-as-usual scenario and does not specifically address risks from direct climate impacts, carbon-constrained negative demand shifts, and possible large shocks to carbon-based financial models and issuances. This case study of an Australian coal port terminal demonstrates how a rating agency provided little to no consideration of how a dynamic climate trajectory:

- increases competitive pressure from domestic supply in target markets, other seaborne exporters, and renewables;
- softens coal demand;
- may decrease the stability of projected net cash flows;
- increases event risks such as legal and regulatory risks, force majeure events, disruptions in supplies, markets, infrastructure, environmental risk, reputational risk, and protest actions, etc.; and
- challenges the standard credit rating horizon of 3–5 years.

If the Australia coal port case study is indicative of the treatment of risks from climate impacts and carbon-constrained demand across rating agency methodologies, then credit rating agencies may be repeating mistakes from the credit crisis. These credit crisis (and potentially climate crisis) mistakes include fundamental short-comings across methodologies, over reliance on information provided by debt issuers or historical trends, insufficient staff and resources, and short-term time horizons.

Credit rating inadequacies could expose rating agencies to liability similar to cases that arose during the credit crisis. In addition, reforms to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act) expose rating agencies to further civil liability risk and increase their regulatory duties with respect to internal controls and disclosure. This overall liability landscape indicates that rating agencies should carefully consider incorporating climate impact and carbon-constrained demand risks into their methodologies.

Incorporating 2°C and ≥4°C climate scenario risks into rating agency methodologies will help facilitate an easier transition to a less carbon-intensive economy and avoid the potential for massive downgrades and consequential shocks to capital markets. Moreover, failures by rating agencies to account for a dynamic climate change trajectory pose a threat not only to markets and investors, but also contribute to systemic over-investment via inflated credit ratings in carbon-intensive projects and industries. Over-investment in carbon-intensive projects and industries is another driver of climate change, which threatens planetary health and the lives, livelihoods, and rights of people around the world who face the immediate and increasingly stark realities of the global climate crisis.

PART 1

Introduction

Nationally Recognized Statistical Rating Organizations,¹ also known as rating agencies, are systemically important to the global economy. After the collapse of the financial markets (2007–2009), the Financial Crisis Inquiry Commission (FCIC), appointed by the US government, found that rating agencies were “essential cogs in the wheel of financial destruction.”² The role that rating agencies played prior to and during the credit crisis—awarding high ratings that were in fact far riskier than the ratings suggested—may be repeated when it comes to evaluation of risk in the context of climate change.

Although the reality of anthropogenic climate change is beyond question, the trajectory of that change is dynamic. With the current climate change trajectory, average temperatures around the globe may rise by greater than 4°C above pre-industrial levels (“≥4°C climate scenario”). A ≥4°C climate scenario would have dra-

Although the reality of anthropogenic climate change is beyond question, the trajectory of that change is dynamic.

matic costs to people, ecosystems, and the global economy. Recognizing these dramatic costs and the severity of the problem, 193 countries have agreed to limit global warming to below 2°C (“2°C climate scenario”). In addition to international agreement, we are also seeing social, consumer, legal, regulatory, and market movement away from business-as-usual practices. This indicates that the trajectory of anthropogenic climate change is not static—it is dynamic and evolving. Thus, financial actors, such as rating agencies, should not rely solely on a business-as-usual climate change trajectory but evaluate risk in the context of a dynamic climate change trajectory. Evaluation of risk in the context of a dynamic climate change

trajectory (shift from ≥4°C climate scenario to 2°C climate scenario) presents at least two major categories of financial risk: climate impact risks and carbon-constrained demand risks.

The first category of risk comprises those that are readily apparent from climate change impacts, such as the physical risks that have a material effect on a debt issuer’s business and operations. The physical risks can include climate change impacts from changing weather patterns, sea-level rise, temperature extremes, and changes in water availability or other natural resources.

The second category of risk comprises those that arise from the constrained demand for fossil fuel products when the current ≥4°C climate scenario changes to a 2°C climate scenario. This shift towards a 2°C climate scenario exposes fossil fuel investments to stranding and the economy as a whole to a “carbon bubble.”³ Shifting from the ≥4°C climate scenario means that fossil fuels permanently change from supply-constrained scarce commodities to demand-constrained perishable commodities.⁴ As Deutsche Bank spelled out, “oil left in the ground means a big chunk of the industry’s current net asset value goes with it.”⁵

It is unclear whether the methodologies of rating agencies fully appraise the risk of rapid value depreciation and other financial risks to fossil fuel and related industries in the context of a 2°C climate scenario. And while rating agencies have analyzed climate change in policy briefings, it appears that current credit rating methodologies do not include the controls necessary to ensure the integrity of those ratings as they relate to a dynamic climate change trajectory. In light of the credit crisis litigation and the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act), these potential inadequacies may expose rating agencies to liability.



PART 2

The Climate Crisis and Financial Risk

The impacts of a $\geq 4^{\circ}\text{C}$ climate scenario are disastrous, as are the financial ramifications of those impacts. Countries around the world have committed to take action to achieve a 2°C climate scenario. While it is as yet unclear whether we will limit global warming below 2°C , there are signals that point to a shift away from a business-as-usual $\geq 4^{\circ}\text{C}$ climate scenario. Moving from a $\geq 4^{\circ}\text{C}$ climate scenario to a 2°C climate scenario means that the majority of proven fossil fuel reserves cannot be consumed. The potential for fossil fuel asset stranding brings risks of over-investment in fossil fuels and related industries. This is similar to the credit crisis when the housing market unexpectedly declined and caused a corresponding crash in liquidity. Likewise, if unanticipated, a dynamic climate change trajectory and corresponding fossil fuel over-investment threatens investors and markets.

Current Climate Change Trajectory

Based on current greenhouse gas emission trajectories, global average temperatures are predicted to increase by 4°C (or higher) above pre-industrial levels by the year 2100.⁶ The anticipated impacts of a $\geq 4^{\circ}\text{C}$ increase on our climate include:

- Millions of people suffering, dying (100 million estimated climate and carbon related deaths by 2030)⁷, and displaced;
- Extreme heat waves (as hot as 64°C or 147°F),⁸ sea-level rise (as high as 130cm or 4 feet),⁹ and more severe storms, droughts, and floods;¹⁰
- Much of the globe's biodiversity lost from the extinction of more than 1 million species by 2050¹¹ and the decimation of nearly all coral reefs by 2100;¹² and



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- Natural feedback mechanisms such as greenhouse gas emissions from thawing permafrost,¹³ less carbon uptake by warming oceans,¹⁴ and disappearing forests,¹⁵ which could lead to unstoppable global warming.¹⁶

The climate crisis has led 193 nations to pledge to limit global warming to below 2°C above pre-industrial levels.¹⁷ Limiting global warming to below 2°C requires that greenhouse gas emissions decrease substantially and soon. Scientists have estimated that “[m]ost fossil fuel carbon will remain in the climate system more than 100,000 years, so it is essential to limit the emission

Limiting global warming below 2°C requires that greenhouse gas emissions decrease substantially and soon.

of fossil fuel carbon.”¹⁸ Reducing greenhouse gas emissions is an urgent concern and the time horizon for taking action is short.¹⁹

A Dynamic Climate Change Trajectory

Because reducing greenhouse gas emissions in the near-term is imperative, business-as-usual cannot continue. Indeed, there are key indicators that the trend away from a $\geq 4^{\circ}\text{C}$ climate scenario will continue to gain momentum within the next decade, such as:

- clean energy market opportunities;
- decoupling of economic growth and carbon intensity;
- evolving social, consumer, legal, and regulatory norms; and
- growth and innovation opportunities from a less carbon-intensive economy.

BOX 1

Economic Costs of $\geq 4^{\circ}\text{C}$ Climate Scenario

Many studies have shown that there are severe financial costs and risks from our current climate change trajectory. These severe financial costs and risks include physical impacts, such as property damage, and corresponding projected decreases in gross domestic product (GDP).²⁰

In terms of global GDP loss, a 700-page report by economist Nicholas Stern produced for the British government in 2006 found that: “[w]ith 5-6°C warming—which is a real possibility for the next century—existing models that include the risk of abrupt and large-scale climate change estimate an average 5-10% loss in global GDP, with poor countries suffering costs in excess of 10% of GDP.”²¹ More recently, the United States White House released a report finding that “a delay that results in warming of 3° Celsius above preindustrial levels, instead of 2°, could increase economic damages by approximately 0.9 percent of global output . . . approximately \$150 billion. The incremental cost of an additional degree of warming beyond 3° Celsius would be even greater. Moreover, these costs are not onetime, but are rather incurred year after year because of the permanent damage caused by increased climate change resulting from the delay.”²²

Also, as noted by the Stern report above, many tropical countries, such as the Philippines will be much harder hit by climate change. For example, one recent economic study found that the total bill for long-term economic growth to the Philippines in today’s US dollars (present discounted value) from increased cyclonic activity due to climate change is \$6.5 trillion.²³ \$6.5 trillion represents only loss from economic growth due to increased cyclones and does not explicitly include all the



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disastrous damage associated with typhoons (such as loss of life). \$6.5 trillion also does not necessarily include economic loss from other negative climate change impacts to the Philippines in addition to increased cyclonic activity such as increased temperature (and corresponding spikes in communicable diseases), decreased agricultural production, rising sea levels, groundwater contamination, coral bleaching, decreased fisheries production, waning eco-tourism capability, etc. The Philippines example is illustrative of the broad and far-reaching economic impacts of climate change and the imperative to halt a $\geq 4^{\circ}\text{C}$ global warming increase. Progress, or failure, to control carbon emissions now will have long term impacts on the health of the global environment and market.

CLEAN ENERGY MARKET OPPORTUNITIES

Greater focus on efficiency, carbon-free power generation, and decentralized power systems increase the likelihood that energy demand can be met without relying on fossil fuels.²⁴ The “present day is a unique moment in the history of electrification where decentralized energy networks are rapidly spreading based on super-efficient end-use appliances and low-cost photovoltaics.”²⁵ Investment in energy efficiency global markets in 2012 was estimated at between \$310–\$360 billion USD—larger than supply-side investment in coal, oil, and gas electricity generation.²⁶ In addition to energy efficiency investments, the market opportunities for clean energy continue to grow. Cost-competitiveness of renewable power generation is improving and renew-

ables “can provide electricity competitively compared to fossil fuel-fired power generation.”²⁷ The increase in cost-competitiveness is leading to building more renewable power capacity. For instance, “103GW of renewable power capacity excluding large hydro is estimated to have been built in 2014.”²⁸

Moreover, in 2014, new renewable energy investments came in at \$270 billion USD.²⁹ 2014 is the first time that new investment in renewable generating capacity exceeded investment in fossil fuel based capacity.³⁰ Also investment in smaller-scale projects reliant on renewables (such as household energy projects) is increasing relative to large-scale fossil fuel projects.³¹ In addition to de-centralized power systems, energy efficiency, and cost-effective renewables, anticipated technology advances in energy storage promise a “true energy revolution” by enabling better energy use at both the grid and household levels.³²

In 2014, the global economy grew by 3% while energy-related carbon emissions flat-lined.

TREND IN DECREASED CARBON-INTENSITY

In 2014, the global economy grew by 3% while energy-related carbon emissions flat-lined.³³ This historic first and the positive global trend towards decreased carbon intensity demonstrates the feasibility of a 2°C climate scenario. Since 2000, the global trend has been a 0.9% decrease in carbon intensity (carbon emissions per dollar of GDP).³⁴ In 2013, when the global economy grew by 3.1%, carbon emissions only grew by 1.8%—a 1.2% decrease in carbon intensity.³⁵ In addition, specific large emitters such as the United States and China have

seen a consistent decoupling of their economic growth from carbon emissions. From 2008–2013, the average annual change in carbon intensity was -2.4% for the US and -1.6% for China.³⁶ The trend in decreased carbon intensity is positive but it still needs to improve. PricewaterhouseCoopers estimates that the global de-carbonization rate needs to occur at 6.2% on an annual basis to limit warming to below 2°C.³⁷

EVOLVING SOCIAL, CONSUMER, LEGAL, AND REGULATORY NORMS

The increase in more regional, national, and sector-level carbon reduction policies, as well as recent international cooperation, pave the way towards limiting warming to below 2°C. Moreover, evolving social norms, consumer behavior, and liability risk add to regional and political action to create favorable conditions for a trajectory change from a $\geq 4^\circ\text{C}$ climate scenario.

On the international front, there is greater pressure to reach a binding global climate change agreement to reduce carbon emissions beyond 2020. In 2011, the Parties to the United Nations Framework Con-

vention on Climate Change (UNFCCC) agreed to “develop a protocol, another legal instrument or an agreed outcome with legal force. . . .” by the 21st Conference of the Parties in December 2015.³⁸ As of April 2015, countries that account for more than

The litigation exposure for entities and investors in the fossil fuel industry is growing.

half of the total carbon pollution from the energy sector have either submitted or announced their contributions for greenhouse gas emission cuts post-2020.³⁹ These contributions are known as Intended Nationally Determined Contributions and, so far, the United States,⁴⁰ European Union, Switzerland, Russia, Mexico, and Norway have submitted their contributions to the UNFCCC.⁴¹ Countries are also exploring ways to enhance mitigation efforts in the shorter-term, including increasing current emission reduction targets or plans. In addition to international movement under the UNFCCC, the United States has agreed

to bilateral carbon-reduction coordination with China (November 2014) and with India (January 2015).

Domestically, countries have a range of national, regional, and local policies that they have implemented, are implementing, or are planning to implement to address climate change. For instance, renewable energy support programs are widespread. Some 138 countries have policies that support renewable energy at the national or state/provincial level.⁴² Also, carbon pricing mechanisms are increasing and directly affect the bottom line of fossil fuel and related industries. Goldman Sachs estimates that “27% of global electricity is generated in a market with a carbon price.”⁴³ Indeed, 73 countries and 1,000 businesses have voiced their support for some sort of carbon pricing mechanism.⁴⁴ This percentage and number will increase as carbon pricing and other regulatory policies become more prevalent and robust.⁴⁵ International movement and national policies, although still inadequate, demonstrate that the climate change trajectory is dynamic.

Evolving social, consumer, and legal



norms also increase the probability that the $\geq 4^{\circ}\text{C}$ climate scenario will not continue in the immediate term. Social pressure around the globe to tackle climate change is gaining momentum. Over a weekend in September 2014, more than 300,000 people participated in a climate change demonstration called the “People’s Climate March” in New York City.⁴⁶ In conjunction with the People’s Climate March, hundreds of other events also took place in 162 countries.⁴⁷ Moreover, preferences, demand, and accessibility for consumer-end renewable choices are also growing. For example, the accessi-

bility of electric vehicles will increase as the cost of batteries decreases more rapidly than projected, a market trend that is already emerging.⁴⁸ Finally, the litigation exposure for entities and investors in the fossil fuel industry is growing. With respect to climate change specifically, there are three types of litigation that could lead to significant financial liabilities:

- direct claims for damage caused by climate change;⁴⁹
- shareholder and investor claims related to risk disclosures, mismanagement, and corporate governance failures; and

- consumer and enforcement claims related to misleading disclosures, advertisements, and engagement in campaigns of disinformation.

OPPORTUNITIES FROM A LESS CARBON INTENSIVE ECONOMY

The costs of restricting carbon in the economy may not be as drastic as some have projected and the complementary benefits of climate change mitigation could outstrip those costs. The Intergovernmental Panel on Climate Change (IPCC) has estimated that switching the 2C° climate scenario

BOX 2

Timeframe and Probabilities of the 2°C and $\geq 4^{\circ}\text{C}$ Climate Scenarios

The time horizon that is considered when evaluating risk is relevant to the carbon bubble just as it was relevant to the credit rating failures with regards to the sub-prime bubble. For example, rating agencies’ standard credit rating horizon of 3–5 years did not adequately factor in balloon payments and other longer-term lending practices in the underlying mortgages. Likewise the rating agencies’ time horizon as it relates to the fossil fuel industry, especially infrastructure projects, fails to account for climate risks that may appear on a longer time horizon.

While rating agencies’ short time horizon is insufficient, a dynamic climate change trajectory presents financial risks from both climate impacts and carbon-constrained demand within the next 3–5 years.

For a carbon-constrained demand environment within the next 3–5 years, three possibilities emerge:

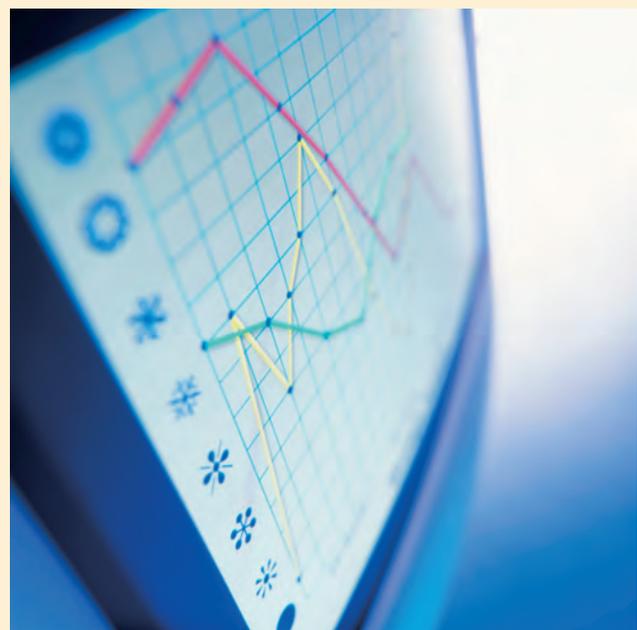
- business-as-usual continues and the $\geq 4^{\circ}\text{C}$ climate scenario is unmodified within the next 5 years;
- regulatory, legal, consumer, social, and market action modifies the $\geq 4^{\circ}\text{C}$ scenario dramatically within 3–5 years consistent with a 2°C climate scenario; and
- regulatory, legal, consumer, social, and market action modifies the $\geq 4^{\circ}\text{C}$ scenario less dramatically within 3–5 years.

The first two possibilities (both no action and dramatic action) are arguably the outliers in the current context. Thus, if we were to assign probabilities to these possibilities, then the first two—the business-as-usual $\geq 4^{\circ}\text{C}$ climate scenario and dramatic action within 3–5 years consistent with a 2°C climate scenario—would likely each have a smaller probability than the last possibility: less dramatic action within 3–5 years towards a 2°C climate scenario.

For the purposes of this paper, the last two possibilities (dramatic action and less dramatic action) are grouped within the idea of a dynamic climate change trajectory, which emphasizes the low likelihood that the current trajectory $\geq 4^{\circ}\text{C}$ climate scenario will continue without change. This low likelihood heightens the need to consider the financial risks of stopping

the current trajectory and how those financial risks affect debt issuers dependent on a business-as-usual fossil fuel industry.

The drivers of financial risk for debt issuers dependent on a business-as-usual fossil fuel industry include environmental climate impacts, changing resource landscapes, and market, competitive, legislative, regulatory, technological, and reputational risks that arise from carbon intensity cuts. For instance, fossil fuel industry investments face the risk of significant and rapid value depreciation under a 2°C climate scenario. Risk of value depreciation arises from a variety of factors including new government regulations, competitive pressure, decreasing demand, evolving social norms and consumer behavior, falling clean technology costs, and liability risk from evolving interpretations of fiduciary and tortious duties of care.



would only slow global economic growth by 0.06%.⁵⁰ In addition, the transition to a low-carbon economy “could actually increase the capacity of the global financial system by as much as \$1.8 trillion between 2015 and 2035.”⁵¹ And although investment of an additional \$44 trillion is needed over the next 35 years to achieve a 2°C climate scenario, this \$44 trillion is offset by over \$115 trillion in fuel savings.⁵²

Investment in energy efficiency and renewables is building. Combined with trending decreased carbon intensity, social and consumer pressure, legal and regulatory action, and market opportunities, the investment in energy efficiency and renewables bodes well for stopping the current trajectory.

Financial Risks of Overinvestment in Fossil Fuels and Related Industries

The 2°C climate scenario presents financial risk to investors and markets because under this scenario, fossil fuel consumption cannot continue unabated. The Governor of the Bank of England Mark Carney has recognized that, “the majority of proven coal, oil, and gas reserves may be considered ‘unburnable’ if global temperature increases are to be limited to two degrees Celsius.”⁵³ As one study found, “The budget [for a 2°C climate scenario] is only a fraction of the carbon embedded in the world’s indicated fossil fuel reserves.... A precautionary approach means only 20% of total fossil fuel reserves can be burnt to 2050.”⁵⁴ The IEA has also estimated that more than two-thirds of current proven fossil-fuel reserves cannot be exploited to obtain a 50% chance of limiting global warming to below 2°C.⁵⁵

Of proven fossil fuel reserves, coal is the most carbon-intensive and the “single greatest source of man-made carbon dioxide (CO₂) emissions heating up our planet.”⁵⁶ A recent study in *Nature* found that of fossil fuels reserves, 82% of known coal reserves must not be used.⁵⁷ Indeed, to meet the 2°C pledge, more than 90% of coal reserves in key coal producers—Australia, Russia, and the United States—cannot be used.⁵⁸

The fact that the majority of fossil fuel reserves cannot be used in a 2°C climate scenario means that these assets will be



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HSBC notes that fossil fuel assets could be stranded by climate change regulation, economics, and energy innovation and that the risks of stranding will become “increasingly acute.”

stranded, indicating they will “lose value or turn into liabilities before the end of their expected economic life.”⁵⁹ Major financial institutions such as Deutsche Bank and HSBC are publicly stating that there is increasing risk that fossil fuel assets will become stranded. For example, HSBC notes that fossil fuel assets could be stranded by climate change regulation, economics, and energy innovation and that the risks of stranding will become “increasingly acute.”⁶⁰

OVER-SUPPLY OF FOSSIL FUELS?

Under a 2°C climate scenario, fossil fuels change from supply-constrained scarce com-

modities to demand-constrained perishable commodities.⁶¹ Already, fossil fuel producers may be modifying their behavior to account for a carbon-constrained environment where fossil fuels are over-supplied. In 2014/2015, lower-cost commodity producers, such as the Organization of the Petroleum Exporting Countries (OPEC), have chosen to supply oil in spite of low prices rather than force an increase in prices through decreased production. As Deutsche Bank remarked, “[s]een in the alternative light of a ‘use it or lose it’ dynamic OPEC’s refusal to cut production [in November 2014]... seems perfectly rational.... OPEC members are sitting on oil reserves worth over a century of current production ... [so] expect the taps to stay fully turned on as producers rush to monetize their assets. Note the comments by the Saudi Arabia’s energy minister last month that even \$20 oil price won’t reverse OPEC’s decision.”⁶² Oversupply presents financial risk to lower-cost commodity producers and their in-

vestors because the weak fossil fuel prices created by oversupply deteriorate fossil fuel company bottom lines.

For higher-cost commodity producers, fossil fuels will likely become stranded. As HSBC recently declared, “[w]ith lower oil prices, producers have a choice: continue to operate and take losses in the hope that prices will recover, or cut losses and shut down facilities.... Where the decision is taken not to produce from a proven reserve or to cease production which was underway, then the asset can be said to be economically stranded—non-viable given the current energy economy. Whether assets are stranded permanently or only in the short term depends on the costs of mothballing versus abandonment.”⁶³ This potential for flooding the market with supply and the stranding of higher-cost projects increases the financial risk for debt issuers dependent on a business-as-usual fossil fuel industry.

“[G]rowing energy efficiency, rising pollution worries, and stiffer competition from other fuels mean that in most countries the tide is turning against coal. Prices have been sliding, political opposition growing, and demand drooping. The Dow Jones Total Coal Market index has fallen by 76% in the past five years.”

— THE ECONOMIST

A long-term over-supplied market is more likely for coal in light of the current supply glut. For instance, “Wood Mackenzie has a bleak view of the prospects for coal prices, predicting the market will remain oversupplied for the rest of the decade with real prices rising just \$US1 to \$US2 a year through to 2020.”⁶⁴ Furthermore, demand for coal is unlikely to increase in the long term. In 2014, China’s coal consumption and production fell for the first time in 14 years,⁶⁵ adding evidence to analysts’ prediction that China’s coal demand will peak by 2016.⁶⁶ Another indicator for thermal coal’s downward trend is the Bloomberg Global Coal Equity Index. According to Carbon Tracker Initiative, this “index has lost half of its value while broad market indices are

up over 30 percent.”⁶⁷ *The Economist* has voiced the opinion that coal faces prolonged demand issues—recently reporting that “growing energy efficiency, rising pollution worries, and stiffer competition from other fuels mean that in most countries the tide is turning against coal. Prices have been sliding, political opposition growing, and demand drooping. The Dow Jones Total Coal Market index has fallen by 76% in the past five years.”⁶⁸ Demand for coal is not likely to recover under a 2°C climate scenario or within a dynamic change trajectory.

IRRATIONAL EXUBERANCE AND A POTENTIAL FINANCIAL CRISIS?

Many in the finance industry continue to rely on the current $\geq 4^\circ\text{C}$ climate scenario (a “carbon bubble”), just as many relied on scenarios where housing prices did not decrease or stabilize prior to the credit crisis. Indeed, just as the risks of sub-prime mortgages loomed over the financial industry, the financial risks of a 2°C climate scenario loom large. Some analysts project that the fossil fuel industry could lose \$28 trillion USD of revenue over the next two decades.⁶⁹ Recently, the Bank of England’s Finance Policy Committee announced that it will investigate whether the carbon bubble could lead to a financial collapse.⁷⁰

In an opinion editorial to the *New York Times*, former US Treasury Secretary Henry M. Paulsen, Jr. compared the credit and climate crises:

We are building up excesses (debt in 2008, greenhouse gas emissions that are trapping heat now). Our government policies are flawed (incentivizing us to borrow too much to finance homes then, and encouraging the overuse of carbon-based fuels now). Our experts (financial experts then, climate scientists now) try to understand what they see and to model possible futures. And the outsize risks have the potential to be tremendously damaging (to a globalized economy then, and the global climate now).⁷¹

Paulsen is not the only prominent government official linking the climate and credit crises. The United Kingdom’s Secretary of State for Energy and Climate Change Ed Davey recently asked if carbon assets are the sub-prime assets of the future.⁷²

A similar pattern evolved during the 2008 credit crisis. The estimates of how much global wealth the credit crisis destroyed range from \$12.8 trillion USD to \$34.4 trillion USD.⁷³ Before the credit crisis, many in the financial industry relied on



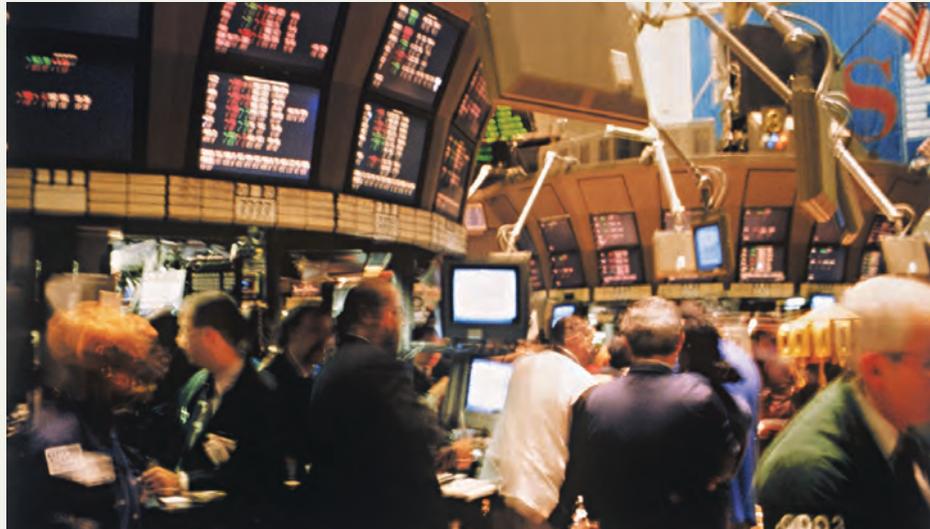
scenarios where housing prices did not decrease or stabilize. One commentator described this as “irrational exuberance,” stating that, “[a]ll the participants who contributed to the housing bubble (government regulators, mortgage lenders, investment bankers, credit rating agencies, foreign investors, insurance companies, and home buyers) acted on the assumption that home prices would continue to rise.”⁷⁴

The continued financial exuberance for fossil fuels—like the housing bubble—may be irrational and even worse, lead to financial disruption or crisis.

The same “irrational exuberance” appears now in the climate crisis as many rely on a future where projected carbon use continues unabated. Indeed, much of the finance behind the fossil fuel industry (energy infrastructure projects, coal export terminals, transmission lines) operates on the $\geq 4C^\circ$ trajectory.⁷⁵ For instance, the commercial banking sector’s finance of the coal sector has increased 360% from 2005 to 2013.⁷⁶ 2013 was a “record year” as commercial banks provided \$88 billion to the coal sector.⁷⁷ Furthermore, the global oil industry spent over \$650 billion on exploration and development of new reserves in 2014.⁷⁸

The continued financial exuberance for fossil fuels—like the housing bubble—may be irrational and even worse, lead to financial disruption or crisis.

BOX 3 Credit Crisis and Ratings



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The rating agencies’ contribution to the housing bubble and ensuing financial collapse arose primarily from rating agencies’ role in the evaluation and ratings of asset-backed securities or “structure finance.”⁷⁹ To understand this contribution, it is important to discuss first, the basics of structured finance that re-packaged the underlying residential mortgages into asset-backed securities and how rating agencies rated the residential mortgage-backed securities (RMBS); and second, rating agencies’ failure to adequately assess RMBS credit risk.

Structured Finance

With regards to the basics of RMBS credit ratings, RMBS deals bundle hundreds or thousands of mortgage payment streams into a single securitization vehicle and then re-sell pieces of that securitization to investors.⁸⁰ Investors who wanted to be paid first (“first priority”) would get debt with the highest credit rating and investors who were paid last would receive the lowest credit rating for that particular asset.⁸¹ Securitizations were rated from the highest possible investment grade for first priority investors to much lower grades for those at the end of line.⁸²

Before the financial collapse or “credit crisis,” it was assumed that investors who bought debt at the highest possible investment grade should have a very small default risk on their investment.⁸³ In reality, there was real systemic default risk for these high investment grade bonds. Indeed, many of the highest investment grade bonds were written down to junk bond status by the end of the credit crisis.⁸⁴ Correspondingly, the overlying structure of the financial markets crumbled when the RMBS and the financial derivatives based on the RMBS (as well as other asset-backed securities) bought by major financial players in reliance of the rating of high investment grade threatened to ruin and/or did ruin these financial players.⁸⁵

Rating Agencies Failure to Adequately Assess Credit Risk

By definition, highly rated investment grade financial products should have very low default risk, and yet the RMBS ultimately had significant, and in many cases realized, default risk.⁸⁶ The rating agencies failed in evaluating the credit risk.⁸⁷ The US Securities and Exchange Commission (SEC) investigated three of the major rating agencies and found procedural failings with their methodologies, potential conflicts of interest, inappropriate reliance on the issuer, and insufficient staff and resources allocated to assessing the risk of RMBS.⁸⁸ Substantively, the rating agencies relied too heavily on past data and failed to engage in a scenario where the housing market declined.⁸⁹ Rating agencies were so preoccupied with the past data that they failed to even account for a scenario in which the housing market stabilized and did not continue to rise.⁹⁰ Moreover, rating agencies did not rigorously analyze the underlying loans and did not project their methodologies upon the performance of the underlying loans over time.⁹¹

PART 3

Credit Rating Methodology

A Case Study of Australia Coal Port Terminal

Rating agencies have systemic importance in the financial markets—they are “central to capital formation, investor confidence, and the efficient performance of the US economy.”⁹² Individuals, institutional investors, and financial regulators rely on accurate credit ratings from rating agencies.⁹³ A rating agency’s business is assessing risk, and the finance industry, as well as the economy, relies on their accurate assessment of that risk.

Rating agencies, such as Standard & Poor’s Ratings Services and Moody’s Investors Service, have provided overall market reports related to the climate crisis.⁹⁴ For example, Moody’s recently released a report, *Environmental Risks and Developments: Impact of Carbon Reduction Policies is Rising Globally*, which notes an “increasing impact” on debt issuers from policies to reduce carbon intensity and mounting credit pressures “for companies that have carbon-intensive products and limited ability to adapt[.]”⁹⁵

Yet while rating agency research reports are helpful, it is unclear whether rating agencies are integrating this overarching analyses into rating-specific debt issuances.⁹⁶ From publicly available documents, it appears that rating methodologies do not adequately include the risks presented from a 2°C climate scenario (both carbon-constrained demand and climate impact risks).⁹⁷ Indeed, rating agencies’ publicly available methodologies do not appear to analyze the dynamism that the 2°C and ≥4°C climate scenarios present. For instance, these materials indicate that rating agencies do not include proxy cost for carbon, stranded assets, or account for specific risks within the fossil fuel industry. The below case study illustrates how rating methodologies lack specialized analysis with regards to a dynamic climate change trajectory.



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Australia Coal Port Terminal Credit Rating

On October 28, 2014, Moody’s assigned a Baa3 rating to \$150 million senior secured fixed-rate notes from Adani Abbot Point Terminal Pty Ltd’s (AAPT) with a maturity date of 2021 and 2024.⁹⁸

AAPT controls an existing coal port terminal Abbot Point Coal Terminal (T1) with a 50 million ton per annum (mtpa) coal capacity⁹⁹ that is part of Adani Group’s (Adani) more than \$10 billion “bet” on coal.¹⁰⁰ As part of this bet, Adani plans to develop a new terminal (T0) with 35–70 mtpa capacity¹⁰¹ adjacent to the existing T1 terminal.¹⁰²

AAPT is one component of the Australia-Galilee Basin coal project, which is a coal super-project that includes 10+ coal projects (port terminal expansions, rails, and nine new coal mines).¹⁰³ The Galilee Basin coal project is often referred to as a “carbon bomb” because the combined project will produce an estimated 700m

tons of CO₂ when burned every year—“substantially more than Australia’s entire annual greenhouse gas emissions of 542m tonnes.”¹⁰⁴

AAPT’s debt issuance, supported by take-and-pay contracts, was rated investment grade Baa3. Moody’s rating scale ranges from Aaa (highest quality debt—subject to the lowest level of credit risk) to C (lowest quality debt—typically in default, with little prospect for recovery of principal or interest).¹⁰⁵ Aaa-Baa3 ratings are considered investment grade while Ba1-C are considered speculative investments.¹⁰⁶

The principal methodology used to obtain AAPT’s Baa3 rating was Moody’s generic project finance methodology.¹⁰⁷ Both Moody’s rating of AAPT and the generic project finance methodology do not appear to explicitly account for financial risks from climate impacts or from a carbon-constrained demand curve under a 2°C climate scenario.

PROJECT

Adani's \$10 billion dollar bet on coal includes development of a thermal coal mine complex (at peak—60 mtpa), a new green-field rail line to transport the coal, and port enhancements at Abbot Point Port coal terminal.¹⁰⁸ The mine and the rail line are collectively referred to as the Carmichael Mine and Rail Project. Analysts have estimated that the energy-adjusted cash-cost of coal product from the Carmichael Mine and Rail Project is US\$84/t, inclusive of royalties, free on board.¹⁰⁹ This price is high in light of current weak coal prices that are expected to stay weak. As *Australian Mining* reported, coal fared badly in 2014; "Newcastle free on board spot prices average[d] US\$73 a tonne in the first eight months of 2014... coal is expected... to settle at US\$77 in 2015."¹¹⁰ However, coal prices have been even weaker than expected; the spot price for coal was around US\$60/t in March 2015.¹¹¹

As analysts have stated, the "potential for continuing weak prices challenges the logic behind developing vast coal mines in remote Australia, and building new railways and ports to get them to the seaborne market."¹¹² Using a breakeven basis, under

current prices "half or more of 2014 potential export production capacity appears unprofitable in Indonesia, Australia, Russia, Colombia, and the USA."¹¹³ Given the poor economics of Adani's bet on coal—an estimated \$84/t break-even price that is much higher than the current \$60/t price—there is a significant chance that the overall project will not contribute to Abbot Point Port coal terminal's export capacity and subsequently AAPT's debt repayments.

METHODOLOGY

The methodology that was used to rate the AAPT debt issuance is Moody's generic project finance methodology.¹¹⁴ Moody's developed the generic project finance methodology (the Methodology) in 2010. It is important to note that the Methodology appears to be equally applicable to high-carbon projects as it is to low-carbon projects because the Methodology is used for projects ranging from parking garages to coal port terminals.¹¹⁵

The Methodology rates projects using four key factors: "long-term commercial viability and competitive position; stability of net cash flows; exposure to event risk; and key financial metrics."¹¹⁶ A fundamental

project risk scoring is obtained by applying the following weights:

- long-term commercial viability and competitive position (25%);
- stability of net cash flows (60%); and
- exposure to event risk (15%).¹¹⁷

This fundamental project risk scoring is then used to determine which financial metrics should be applied.¹¹⁸ After application of the financial metrics, the financial metrics analysis is combined with the fundamental project risk scoring, notching, and other considerations to obtain the final credit rating.¹¹⁹

The Methodology contains a 60% weighting on cash flows in the fundamental risk scoring, and the subsequent financial metrics analysis adds an additional focus on cash flow. This focus on cash flow in the ratings methodology could crowd out analysis related to the market price for the underlining commodity in a dynamic climate trajectory and/or the viability of the project under the market conditions of a 2°C climate scenario. This is particularly concerning if rating agencies have also not directly considered how a dynamic climate trajectory affects cash flow. The primacy of cash



flow, combined with other inadequacies in considering climate risk as described below, may leave debt issuances rated by the Methodology vulnerable to inflated credit ratings.

ANALYSIS

Moody’s applied the Methodology to rate \$150 million of AAPT’s debt. Using the Methodology and Moody’s announcement of its rating of AAPT (Moody’s Rating Action), we analyze Moody’s treatment, or lack of treatment, of carbon-constrained demand and climate impact risks. As discussed above, the Methodology’s scoring factors are: long-term commercial viability and competitive position (25%), stability of net cash flows (60%), and exposure to event risk (15%).

In each section, we present a table containing Moody’s description of the sub-factors of each factor, Moody’s description of what facts warrant a Baa rating, Moody’s Rating Action’s discussion of the facts concerning

AAPT, and our initial analysis of how a 2°C climate scenario could affect the rating of AAPT’s debt. This is followed by further analysis of the 2°C climate scenario and a dynamic climate trajectory as it applies to AAPT.

LONG-TERM COMMERCIAL VIABILITY & COMPETITIVE POSITION

A 2°C climate scenario exposes AAPT to greater competitive risk and calls into question the industrial logic of financing more coal infrastructure. Under a 2°C climate scenario, coal consumption decreases due to changing consumer, legal, and social norms. Coal also becomes a perishable commodity because only 18% of coal reserves can be used.¹²⁴ These factors will increase competitive pressure from domestic supply in target markets, other seaborne exporters, and renewables, and weaken coal demand in target markets. This increase in competitive risk and lack of industrial logic

alone may warrant a downgrade for AAPT’s debt issuance, but AAPT also faces competitive risk from an export terminal that came online this year. In addition, as discussed in the “Stability of Net Cash Flows” section (Table 2, p. 14) analyzing the scoring factor, it is not apparent that costs can be passed on for AAPT’s take-or-pay contracts and/or its primary offtaker, Glencore Xstrata (rated Baa2) “without any question or adverse circumstances.”¹²⁵

Competitive pressure increases

A carbon-constrained economy where only 18% of coal reserves can be consumed will increase competition from other major seaborne coal exporters such as Indonesia, Colombia, South Africa, and Russia. As discussed above, the thermal coal market is already oversupplied.¹²⁶ Under a 2°C climate scenario, oversupply will continue to increase as suppliers flood the market with coal rather than risk asset stranding.

TABLE 1
Long-Term Commercial Viability & Competitive Position

Moody’s Sub-Factors of the LTCV & CP Scoring Factor	Moody’s Discussion of the Baa Rating from the Methodology	Moody’s Rating Action Assigning a Definitive Baa3 rating to AAPT	2°C Climate Scenario Analysis of AAPT Rating
Competitive Situation	“Product or service exposed to some competition but product or service has solid entrenched competitive position in the served market(s). Position is stable over time. OR: product/service provided is not in top competitive position but highly rated offtaker of product/service can pass on cost to its own customers (e.g. by regulation) without any question and adverse consequence.” ¹²⁰	“The Baa3 rating primarily reflects AAPT’s strong market position and the stability of its operating cash flows derived under the take-or-pay agreements with its counterparties over the entire terminal capacity. . . . However, AAPT’s rating is constrained by the group’s high financial leverage and the challenges facing the coal mining sector as commodity prices continue to face downward pressure due to growing supply in key export markets.” ¹²¹	Reasons why AAPT may not warrant a Baa3 rating: <ul style="list-style-type: none"> • If only 18% of coal reserves can be utilized in a carbon-constrained environment, then seaborne coal prices will decrease as competition increases in an oversupplied market. Competition arises from renewables, domestic suppliers in target markets, and other seaborne suppliers. • It is unclear whether port capacity will be fully utilized. A direct competitor, Wiggins Island Coal Export Terminal (WICET), came online in April 2015. • It is exposed to risk because the off-taker for take-or-pay contracts may not be able to directly pass on costs.
Industrial Logic & Alignment of Interests	“Industrial logic is solid; key parties’ interests are generally well aligned or there could be some misalignment but the parties can easily be replaced with little negative impact on the project” ¹²²	“Although the coal market is experiencing challenging conditions, with volatile and falling prices exerting pressure on marginal mines, coal export volumes continue their upward trend. Moody’s base case expectation is that AAPT’s mine counterparties will remain sufficiently viable at prevailing coal prices for the purposes of continuing production for export demand.” ¹²³	Reasons why AAPT may not warrant a Baa3 rating: <ul style="list-style-type: none"> • The project’s competitive position decreases under a 2°C climate scenario. • Coal export volumes do not continue their upward trend. • Concentration of risk in the coal industry is exacerbated in an over-supplied coal market.

The Long-Term Commercial Viability & Competitive Position (LTCV & CP) scoring factor comprises 25% of Moody’s fundamental project risk scoring and is composed of two sub-factors: (1) competitive situation and (2) industrial logic and alignment of interests.



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The seaborne coal market will also suffer if key import markets determine that coal is a perishable good, and thus they must use their own fossil fuel resources. For instance, in India, the costs of imported coal and a focus on energy security has already prompted the national government to push towards domestic coal use and production. Indeed, imported coal costs 5–6

From 2010 to 2014, three coal plants were delayed or cancelled for every one plant completed globally; and in India, six plants have been shelved or canceled for each completed plant.

rupees per MW in India versus 3 rupees per MW for domestic coal and 4 rupees per MW for renewables.¹²⁷ If a majority of coal import markets refocus on utilizing domestic fossil fuel resources, then competition will likely intensify as more global pressure is exerted to keep fossil fuels in the ground. In order to retain the value of their own resources, many countries may promote policies that further strain the seaborne thermal coal market.

Competition from renewables also decreases the industrial logic of AAPT's debt. Energy investments are undergoing substantial shifts away from coal-dependent energy. For instance, new investment in

renewable generation capacity exceeded investment in fossil fuel-based generation capacity for the first time in 2014.¹²⁸ Also, investment in smaller-scale projects reliant on renewables (such as household energy projects) is increasing relative to large-scale fossil fuel projects.¹²⁹

Coal demand softens

While Moody's recognized sector-wide risk in *Environmental Risks and Developments: Impact of Carbon Reduction Policies is Rising Globally*, the press release for that report stated that "thermal coal producers will continue to enjoy the growth of demand in emerging markets, especially China and India."¹³⁰ This demand-growth assessment is problematic. In 2014, Chinese coal consumption and production fell,¹³¹ and some analysts predict that China's coal demand will peak by 2016.¹³² Moreover, the infrastructure that drives coal demand (planned coal-fired plants) is being postponed and canceled at dramatic rates.¹³³ From 2010 to 2014, three coal plants were delayed or cancelled for every one plant completed globally; and in India, six plants have been shelved or canceled for each completed plant.¹³⁴ Moreover, the Indian government is increasingly focused on renewables.¹³⁵ This is problematic for AAPT because Adani anticipates selling much of the project's coal in India.¹³⁶ In addition to inadequate infrastructure for coal consumption, there

are barriers to growth in seaborne coal-demand from domestic supply and renewables. Thus, an overall decrease in coal demand under a 2°C climate scenario may not be corrected by demand from China and India.

Moreover, in a 2°C climate scenario, demand for coal will likely dramatically diminish because, in the energy sector, coal is the low hanging fruit to decrease greenhouse gas emissions. It is the most carbon-intensive fuel and is also accompanied by the worst direct health impacts from the toxins and waste product released during its entire life-cycle.¹³⁷ A recent study concludes that "[f]ossil fuel usage for electricity generation in the US results in the loss of hundreds of billions of dollars of economic value annually."¹³⁸ There are other external costs such as "water pollution, agricultural losses, and damage to natural ecosystems"¹³⁹ which, when taken into account, lead analysts to "place the actual cost of coal-fired electricity generation to society at two to four times market price."¹⁴⁰ Thus, coal is a natural focal point as nations and regions move to reduce carbon.

Competitive risk from WICET coal port terminal

An immediate competitive risk for AAPT adds to its overall poor outlook. AAPT now has direct competition from the Wiggins Island Coal Export Terminal (WICET) in

Gladstone, Queensland. WICET is a green-fields coal export facility with an initial export capacity of 27Mtpa.¹⁴¹ It came online in April 2015.¹⁴² Coal exported by WICET exacerbates the global competitive problem because it could further decrease the usage rate of AAPT’s port capacity. Already Goldman Sachs has stated that “there is excess port capacity in many regions, and the average utilization rate of coal terminals in Australia, Colombia, and South Africa has fallen below 70%.”¹⁴³

STABILITY OF NET CASH FLOWS

As Moody’s acknowledges, take-or-pay agreements are not dispositive of credit risk. In the Methodology, Moody’s states, “Moody’s has always held that the reliability of such contractual obligations—i.e. take-or-pay or offtake contract—is a function of the economic viability of the project. The less economical it is, the less likely that it will be honoured if the offtaker can find a way out[.]”¹⁴⁸ Economic viability of AAPT’s project could sharply and dramatically decline under a 2°C climate scenario. Indeed, a managing director at Moody’s

Economic viability of AAPT’s project could sharply and dramatically decline under a 2°C scenario.

recently stated that an “increase in ‘direct carbon liabilities’, such as carbon permits and/or carbon taxes, as well as the emergence of disruptive technologies, such as solar power, are already having a tangible impact on rated companies in select carbon-intensive industries[.]”¹⁴⁹

Furthermore, AAPT’s primary offtaker, Glencore Xstrata, could be considered a concentrated risk because:

- Glencore Xstrata is also the largest offtaker for WICET—AAPT’s competitor.¹⁵⁰
- Glencore Xstrata’s rating, only Baa2,¹⁵¹ is likely subject to similar fundamental climate trajectory risks as AAPT.
- Glencore already suspended production for several weeks in 2014¹⁵² and may suspend production again.¹⁵³
- AAPT’s port operator, Abbot Point Bulkcoal Pty Ltd, is a wholly-owned subsidiary of Glencore Xstrata.¹⁵⁴

Finally, under a 2°C climate scenario, coal-powered generation may become an obsolete technology. Coal is the “single greatest source of man-made carbon dioxide.”¹⁵⁵ Under a 2°C climate scenario, coal use must decrease substantially.¹⁵⁶ Furthermore, proposed carbon technologies that would enable continued use of coal at some level—such as carbon capture and sequestration—remain commercially unproven at industrial scales.¹⁵⁷ Just as importantly, as pressures increase to reduce other types of emissions from coal plants (e.g., sulfur dioxide), the construction, compliance, and operation costs of coal plants continue to increase relative to other technologies.

EXPOSURE TO EVENT RISK

While a ≥4°C climate scenario is disastrous, the impacts of a 2°C climate scenario can also be devastating. For instance, if global warming is not kept below 1.5°C warming, scientists predict that 90% of coral reefs will perish.¹⁵⁹ A 2°C climate scenario also has more dangerous impacts and risks than previously anticipated. The IEA noted, “the risks previously believed to be associated

TABLE 2
Stability of Net Cash Flows

Moody’s Sub-Factors of SNCF Scoring Factor	Moody’s Discussion of the Baa Rating from the Methodology	Moody’s Rating Action Assigning a Definitive Baa3 rating to AAPT	2°C Climate Scenario Analysis of AAPT Rating
Predictability of Net Cash Flows	“Good degree of predictability of net cash flows. Mismatches are manageable and/or relatively short lived” ¹⁴⁵	Relies on the “stability of [AAPT’s] operating cash flows derived under the take-or-pay agreements with its counterparties over the entire terminal capacity” and states that “[t]he counterparty contractual arrangements provide support in that they entitle AAPT to pass through all operating costs as well as earn a return on its asset base”. ¹⁴⁶	Reasons that AAPT may not warrant a Baa3 rating: <ul style="list-style-type: none"> • In the current and potential long-term coal supply glut, cash flow becomes less predictable, and would likely decrease, under a 2°C climate scenario. • Take-or-pay contracts are not dispositive of credit risk. • Risk is concentrated in a declining industry.
Operating Technology	“Commercially proven technology/process” ¹⁴⁷	No relevant information included in Rating Action	Reasons that AAPT may not warrant a Baa3 rating: <ul style="list-style-type: none"> • Under a 2°C climate scenario, 82% of coal reserves must be unused, and thus coal-powered generation may become an obsolete technology. • Removing carbon emissions from coal on a commercial level is unproven at both the source and endpoints.

The Stability of Net Cash Flow (SNCF) scoring factor comprises 60% of Moody’s fundamental project risk scoring and is composed of four sub-factors: predictability of net cash flows, operating technology, sponsor/operator, and capital expenditures. Two sub-factors for this scoring factor—“sponsor/operator” and “capital expenditures”—are not included in the table below because they are less relevant to a 2°C climate scenario. However, with recent press surrounding the organization and ownership structure of AAPT,¹⁴⁴ these factors also indicate that Moody’s may want to reconsider its assessment of AAPT.

TABLE 3
Exposure to Event Risk

Moody's Sub-Factors	Moody's Discussion of the Baa Rating from the Methodology	Moody's Rating Action Assigning a Definitive Baa3 rating to AAPT	2°C Climate Scenario Analysis of AAPT Rating
[No sub-factors listed]	"Potential material unmitigated exposures but with low probability; Most events covered by insurance or through contracts although payments may be subject to negotiations or some limits" ¹⁵⁸	No relevant information was included within the Rating Action.	AAPT may not warrant a Baa3 rating because Moody's does not appear to factor in either climate impact or carbon-constrained demand risks that arise from: <ul style="list-style-type: none"> • regulatory and legal changes; • force majeure events; • disruptions in supply, markets, inbound and outbound infrastructure; • environmental risk; and • protest actions.

The Exposure to Event Risk scoring factor comprises 15% of Moody's fundamental project risk scoring and contains no sub-factors.

with an increase of around 4°C in global temperatures are now associated with a rise of a little over 2°C, while the risks previously associated with 2°C are now thought to occur with only a 1°C rise.¹⁶⁰ Thus, ratings methodologies should factor in climate impact risks under either scenario.

Moody's Rating Action addresses coal pricing but does not address all the event risks listed in the Methodology that relate to a 2°C climate scenario and/or a ≥4° climate scenario, namely: regulatory and legal changes, force majeure events, disruptions in supplies, markets, infrastructure-inbound and outbound, environmental risk, and protest actions.¹⁶¹ A few examples of how the above may apply include:

- *Exposure to environmental risk:* Climate change impacts will lead to more extreme weather events, and the Queensland Coast has been identified as vulnerable to more intense cyclones, extreme rainfall, and extreme heat.¹⁶² Climate impacts will also likely increase annual flooding in Queensland, which can incapacitate mines for months.¹⁶³ Moreover, if the Australia-Galilee Basin coal project as a whole goes forward, it will further exacerbate climate impact risks. Indeed, the projects are located in Queensland one to two hours from Australia's Great Barrier Reef and threaten the Great Barrier Reef's fragile ecosystem by both short and long-term climate change impacts and by other environmental impacts from dredging, pollution, increased marine traffic, etc.¹⁶⁴
- *Force majeure events:* Cyclones, in particular, pose material risk for any

companies proposing infrastructure projects in Queensland. As an example, the rail operator Aurizon¹⁶⁵ has recently posted a loss of earnings up to \$30 million AUD due to costs associated with the recent Category 5 Cyclone Marcia. The financial impacts were lost revenue, costs of repairing damaged infrastructure, and reputational costs.¹⁶⁶

- *Regulatory and legal changes:* As countries (both their governments and their citizens) continue the shift from a ≥4° climate scenario to a 2° climate scenario, more regulatory and legal changes will arise in both Australia and target markets. This event risk is significant as one recent example shows: "Queensland Labor Party achieved one of the biggest

swings in Australian political history... [and] has vowed a Labor government would scrap taxpayer subsidies for any Galilee coal-related project, including Adani's."¹⁶⁷

It is important to note that the scoring factors and their sub-factors in the Methodology do not explicitly consider timeframe. This absence is notable because the Methodology states that the "one feature that all issuers covered by this methodology have in common is their nature; that is they are all long-term infrastructure entities financed on a project finance basis."¹⁶⁸ Long-term infrastructure projects are particularly vulnerable to the risks presented by a dynamic climate change trajectory.



PART 4

Liability of Credit Rating Agencies



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Credit rating agencies have legal responsibilities—and are exposed to liabilities—under both common law and statutory law. At the federal level, the activities of credit rating agencies are governed by a number of specific statutes and regulations, including the Securities Act of 1933,¹⁶⁹ the Securities Exchange Act of 1934,¹⁷⁰ Financial Institutions, Reform, Recovery, and Enforcement Act of 1989,¹⁷¹ the Credit Rating Agency Reform Act of 2006,¹⁷² and most recently, the Dodd-Frank Act.¹⁷³ Adopted in response to the financial collapse of 2008, the Dodd-Frank Act established new safeguards with respect to the internal controls and methodologies applied by

credit rating agencies, and it instituted additional pathways through which private individuals may sue.

Regulatory Duties

The Dodd-Frank Act requires rating agencies to “establish, maintain, enforce, and document an effective internal control structure governing the implementation of and adherence to policies, procedures, and methodologies for determining credit ratings.”¹⁷⁴ To implement the Dodd-Frank Act, the SEC promulgated rules applicable to rating agencies.¹⁷⁵ Specifically, the SEC instituted rules that require rating agencies to: consider issues concerning effective internal control structures such as sufficient

resources, periodic review of in-use methodologies, and public participation; correct deficiencies in their internal control structures; and disclose forms concerning each rating.¹⁷⁶ Many of these rules will be effective June 15, 2015 and are relevant to how rating agencies respond to and incorporate risk information in light of climate change.

INTERNAL CONTROL STRUCTURES, PERIODIC REVIEW, AND ADEQUATE STAFF AND RESOURCES

When creating an effective internal control structure, rating agencies must develop rating methodologies and follow those rating methodologies in accordance with their own policies and procedures.¹⁷⁷ Rating

agencies must also consider: (1) whether they have devoted sufficient resources to implement their internal control structures,¹⁷⁸ and (2) establishing controls to ensure that in-use rating methodologies are periodically reviewed.¹⁷⁹ Rating agencies must also ensure that deficiencies in the internal control structure are identified and addressed.¹⁸⁰ Finally, the SEC may suspend or permanently revoke the operating license of a rating agency upon notice, hearing, and findings that the rating agency “does not have adequate financial and managerial resources to consistently produce credit ratings with integrity.”¹⁸¹

The absence of specific analysis—as well as Moody’s reliance on an issuer-based scenario (e.g., the world will continue its trajectory towards $\geq 4^{\circ}\text{C}$ warming) and its use of a generic methodology that applies equally to coal port terminals as to parking garages—suggests that rating agencies should periodically review their in-use methodologies.

As the AAPT case study shows, specific analysis regarding a dynamic climate trajectory is lacking. This absence of specific analysis—as well as Moody’s reliance on an issuer-based scenario (e.g., the world will continue its trajectory towards $\geq 4^{\circ}\text{C}$ warming) and its use of a generic methodology (equally applicable to coal port terminals as to parking garages)—suggests that rating agencies should periodically review their in-use methodologies. Periodic review of the in-use methodologies in light of a dynamic climate trajectory is advisable given the specialized risks that the fossil fuel industry and related industries face.¹⁸²

The Dodd-Frank Act and related regulations are also relevant to whether rating agencies are allocating sufficient staff and resources to analyze a dynamic climate trajectory. Prior to and during the credit crisis, rating agencies had insufficient staff and resources to accurately rate securitized products.¹⁸³ Similarly, rating agencies must now consider whether the allocation of staff and resources to their internal control

structures do and can adequately address the risks presented by a dynamic climate trajectory. Rating agencies may need to revisit their internal control structures in order to ensure that they have the staff and resources to implement rating methodologies that incorporate climate risk in accordance with their policies and procedures.¹⁸⁴ The significance of this task, and the resources required to undertake it responsibly, should not be underestimated.

PUBLIC PARTICIPATION AND DISCLOSURE

While the SEC cannot regulate the substance of credit ratings or the procedures and methodologies by which any rating agency determines credit ratings,¹⁸⁵ the rules promulgated under the Dodd-Frank Act create additional transparency requirements for rating agencies and advise rating agencies to seek public comment. Specifically, the regulations state that rating agencies must consider creating internal controls that allow the public to provide comments about which methodologies should be updated and the substance of those methodologies. They must also consider creating internal controls that take into account comments made by the public about rating methodologies.¹⁸⁶ The rules also require that for asset-backed securities (ABS) rating agencies “disclose . . . certain qualitative and quantitative information about the credit rating.”¹⁸⁷ These disclosures could highlight the need to address methodological inadequacies related to a dynamic climate change trajectory.

During the credit crisis, rating agencies failed to maintain and implement procedural checks across methodologies.¹⁸⁸ In the current climate crisis, this same inadequacy may be present if rating agencies do not stress test each methodology for the different possibilities and financial risks that a 2° climate scenario presents. With the regulations, rating agencies must now disclose key information concerning ABS such as:

- the “main assumptions and principles used in constructing the procedures and methodologies used to determine the credit rating[.]”¹⁸⁹
- the “potential limitations of the credit rating, including the types of risks excluded from the credit rating[.]”¹⁹⁰

- an “explanation or measure of the potential volatility of the credit rating including: (1) Any factors that are reasonably likely to lead to a change in the credit rating; and (2) The magnitude of the change that could occur under different market conditions determined by the nationally-recognized statistical rating organization to be relevant to the rating.”¹⁹¹ and
- “information on the sensitivity of the credit rating to assumptions made by the nationally recognized statistical rating organization[.]”¹⁹²

The disclosure of above information will allow the public to better understand whether rating agencies include assumptions regarding a dynamic climate trajectory in their ABS rating methodologies and how rating agencies view the limitations of their ratings if they do not include climate assumptions. Moreover, this disclosure should extend beyond ABS. Rating agencies should disclose the volatility and sensitivity of all credit ratings, especially those in the fossil fuel industry and related industries.

Civil Liability

Historically, civil liability under US law for rating agencies has been extremely limited due to strong constitutional and securities laws defenses.¹⁹³ Despite these strong defenses, numerous lawsuits were filed against rating agencies after the 2008 financial crisis.¹⁹⁴ Private and government plaintiffs sued rating agencies under state common law as well as state and federal statutes.¹⁹⁵ Although many statutory and common laws claims were dismissed, the credit crisis litigation suggests that claims based on consumer protection laws, negligent misrepresentation, and fraud can survive the motions to dismiss upon which rating agencies have routinely prevailed in the past, forcing rating agencies to choose between settling potentially costly claims or defending expensive cases on their merits.¹⁹⁶

In the wake of the credit crisis, plaintiffs brought suit on an array of common law and statutory claims premised on alleged inadequacies in rating agency methodologies or practices that contributed to that crisis, such as assumed future liquidity in

reliance on past data and historical trends. In *California Public Employee Retirement Systems v. Moody's Investor Services*, for example, one of the largest public pension plans (CalPERS) in the United States filed suit against a rating agency. When affirming the trial court's finding that CalPERS had successfully demonstrated a probability of prevailing on the merits of its negligent misrepresentation claim, the appellate court discussed how a future liquidity assumption was relied upon to the point at which an expert opined that the ratings agencies "had no empirical or logical basis of assumption."¹⁹⁷ If rating agencies assume that the current climate trajectory of $\geq 4^{\circ}\text{C}$ global warming is static, then this assumption may be viewed by testifying experts, and subsequently affirmed by the courts, as illogical in light of the empirical support for a dynamic climate change trajectory.

Moreover, the failure to factor in a carbon-constrained market under a 2°C climate scenario or account for the impact of stranded assets to fossil fuel producers and related industries could lead to fact patterns in the climate context that are similar to credit crisis cases. In successful credit crisis cases, claims survived dispositive motions when plaintiffs demonstrated that the ratings were faulty and there was not a reasonable basis for believing the ratings were accurate or the rating agencies had access to non-public information that contradicted the rating.¹⁹⁸ These types of claims are especially likely to survive in cases where the information was disseminated to select groups of investors rather than to the public at large.¹⁹⁹

The Dodd-Frank Act has further increased the likelihood of the survival of future plaintiffs' claims against credit rating agencies. First, Section 933 of Dodd-Frank Act confirms the availability of civil remedies under the Exchange Act. Specifically, complaints against rating agencies can now state a claim by alleging that a rating agency "knowingly or recklessly failed" to either "conduct a reasonable investigation of the rated security with respect to the factual elements relied upon by its own methodology" or "obtain reasonable verification of such factual elements" from sources that are competent and independent of the issuer



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This significant settlement combined with judicial dispositions trending away from dismissals as a matter of law suggest that rating agencies face broader litigation risk—a risk that could manifest in the climate change context if rating agencies fail to accurately assess credit risk in the context of a dynamic climate change trajectory.

and underwriter.²⁰⁰ This claim expansion could be relevant to liability within the context of the climate crisis if rating agencies rely on the issuer's scenario. Prior to the credit crisis, rating agencies often relied on the issuer for information regarding the underlying loans.²⁰¹ Now, rating agencies may again be improperly relying on the issuer's climate scenario and not including or factoring in their own assumptions regarding different climate scenarios.

Another private right of action arises from Section 939G of the Dodd-Frank Act. Section 939G repealed Rule 436(g) under the Securities Act—meaning that a rating

agency can now be sued as an expert under Section 11 of the Securities Act. This right of action is available when rating agencies provide credit ratings that are included or incorporated by reference into a registration statement or prospectus.²⁰² Although this private right of action could potentially prove very important, its impact has been limited by rating agencies' wide refusal to give consent to the use of their ratings in registration statements.²⁰³

Coupling the survival of claims' past dispositive motions with their subsequent settlements demonstrates that rating agencies' civil litigation exposure is not insubstantial.²⁰⁴ For instance, on February 2, 2015, McGraw Hill Financial Inc. and its subsidiary Standard & Poor's Ratings Services entered into a \$1.375 billion settlement to settle lawsuits filed by nine states and the US Department of Justice.²⁰⁵ This significant settlement combined with judicial dispositions trending away from dismissals as a matter of law suggest that rating agencies face broader litigation risk—a risk that could manifest in the climate change context if rating agencies fail to accurately assess credit risk in the context of a dynamic climate change trajectory.

PART 5
Conclusion

By relying on the $\geq 4^{\circ}\text{C}$ global trajectory and failing to account for a 2°C climate scenario, rating agencies could be repeating the mistakes of the credit crisis where risk was underestimated to the detriment of the global financial system. The project finance methodology and its application to the Australia Adani coal terminal illustrate the

ways in which rating agencies' current rating methodologies may be increasingly out of step with climate, and market, realities and, thus, increasingly inaccurate as tools for assessing credit risk. If rating agencies fail investors, individuals, and financial regulators again, then credit crisis litigation and the Dodd-Frank Act expose rating agencies to potentially significant legal risk.

Moreover, failures by credit rating agencies not only pose a threat to markets and investors but also add to continued overinvestment in projects and industries that contribute to climate change, which threatens the lives, livelihoods, and rights of people around the world who face the immediate, long term, and increasingly stark realities of the global climate crisis.



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Endnotes

- 1 Nationally Recognized Statistical Ratings Organizations are rating agencies that have registered with the United States Securities & Exchange Commission (SEC). There are currently ten Nationally Recognized Statistical Ratings Organizations and three of the ten (Standard & Poor's, Moody's, and Fitch) contributed 97% of the total outstanding credit ratings as of December 31, 2013. Nationally Recognized Statistical Rating Organizations, 79 Fed. Reg. 55,077, 55,085 (Sept. 15, 2014) (to be codified at 17 C.F.R. pts. 232, 240, 249, and 249b) citing Pub. L. No. 111-203, 931(5) [hereinafter "Implementing Release"].
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- 184 There is a material weakness in an internal control structure if there is a reasonable possibility that the structure does not prevent or detect a failure of the rating agency to implement a ratings’ methodology in accordance with its policies and procedures. To avoid material weaknesses within their internal control structures, rating agencies should consider whether their internal control structures ensure that they have developed and deployed the staff and resources needed to follow their own policies and procedures in order to accurately and adequately assess the credit risk under a dynamic climate change trajectory. See § 240.17g-3 (a)(7)(iii).
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(MIS)CALCULATED RISK AND CLIMATE CHANGE

Are Rating Agencies Repeating Credit Crisis Mistakes?

By not adequately accounting for climate risks, rating agencies could be repeating the mistakes of the credit crisis where risk was underestimated to the detriment of the global financial system. The case of the Australia Adani coal terminal illustrates how current rating methodologies that rely on the $\geq 4^{\circ}\text{C}$ global trajectory and fail to account for a 2°C climate scenario could expose rating agencies and investors to significant legal and financial risk.



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