

SECTOR IN-DEPTH

16 February 2017

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Environmental Risks

Shift in US Climate Policy Would Not Stall Global Efforts to Reduce Carbon Emissions

- » **Institutional and private sector forces will underpin global decarbonisation efforts despite potential changes in US climate policy.** Climate policy in the [US](#) (Aaa stable) is likely to become less ambitious under President Donald Trump, which would pose a potential challenge to the Paris Agreement's objectives should other countries back away from their current commitments. Nevertheless, robust institutional and private sector momentum will continue to drive sustainable and climate agendas forward. As such, the effects of carbon transition will continue to have material credit implications for rated entities in a number of industrial sectors globally.
- » **Most countries have reaffirmed their Paris Agreement commitments since the US elections.** While US leadership in global climate negotiations has been important, it may become increasingly marginalised on climate issues should it temper its Paris Agreement commitments. The other three largest emitters—[China](#) (Aa3 negative), the [EU](#) (Aaa stable) and [India](#) (Baa3 positive)—have reaffirmed their commitments.
- » **Sub-national green initiatives will be important in moving national policies forward, including in the US.** Initiatives such as the Under2 Coalition, which covers more than one third of global GDP, demonstrate increasing sub-national commitment to climate action. More than two dozen US states have programmes to reduce emissions, providing a countervailing influence to any federal climate policy changes.
- » **Institutional focus on environmental risks and green finance will remain strong.** Global climate policy is not limited to the Paris Agreement. For example, the G20 study group on green finance and the Financial Stability Board (FSB) taskforce on climate-related financial disclosures suggest that policy momentum will be sustained.
- » **The number of private sector companies pursuing climate change strategies will continue to rise.** Corporate leadership and institutional investor focus on carbon emissions reduction and broader sustainability issues is increasing. These trends, together with shifting consumer preferences and technological change, will drive more large companies to disclose climate-related financial risks and set emission reduction targets.
- » **Prevailing market and technological trends support investment in less carbon-intensive initiatives.** Non-policy drivers—the ongoing shift from coal to gas, the declining cost and increasing efficiency of renewable energy and technological advancements in areas such as electricity storage and alternative fuel vehicles—will support decarbonisation trends.

Institutional and private sector forces will underpin global decarbonisation efforts despite potential changes in US climate policy

Climate policy in the US is likely to become less ambitious under the leadership of President Donald Trump. Since taking office on 20 January, the new president has reaffirmed his commitment to eliminate the Climate Action Plan, a key policy initiative of the outgoing administration focused on cutting carbon emissions, investing in clean energy and leading global efforts on climate change.¹

President Trump's campaign promises also point towards a significant reversal in US climate policy, including repeal of the Clean Power Plan via executive action, cuts to federal spending on international climate programmes, support for the use of fossil fuel energy and, potentially, withdrawal from the Paris Agreement.²

At this stage, it is too early to determine precisely which areas of US climate policy may be moderated or reversed, and when. It can be difficult to translate campaign promises into policy execution owing to political or legal constraints. For example, under the Clean Air Act, the regulation of greenhouse gas emissions falls under the jurisdiction of the Environmental Protection Agency, and any change to the law would take time to implement.

It would also take time to withdraw from the Paris Agreement. Its Article 28 dictates that any country wishing to pull out after signing would have to wait four years.³ However, the US could choose to simply ignore its voluntary commitments or, in an extreme scenario, pull out of the United Nations Framework Convention on Climate Change altogether.

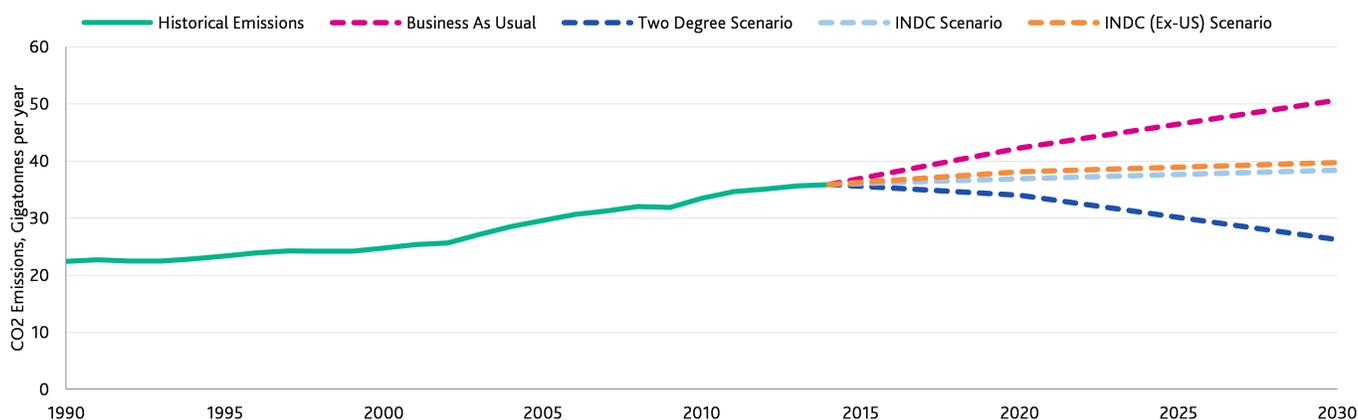
Even if the US were to take these actions, we do not believe that the pathway to lower global emissions would be materially derailed over the coming decade, all else being equal.

In Exhibit 1, we estimate the impact of a "business-as-usual" US emissions trajectory on the global INDC scenario (that is, the global carbon emissions pathway if all countries, excluding the US, were to implement their Paris Agreement commitments).⁴ From our estimates, it appears likely that any deviation in the global emissions pathway would be small, and instead fall in line with the typical uncertainty inherent in long-term projections. This reflects the fact that carbon emissions in the US have been on a gradual downward trend since 2007. According to the Environmental Protection Agency, annual emissions in the US electricity generation and transportation sectors peaked in 2007, and have shown a gradual decline thereafter. Combined, these two sectors account for 56% of the country's total greenhouse gas emissions.⁵

Exhibit 1

Material Change to Business-As-Usual Emissions Pathway Likely Even With Potential Changes in US Climate Policy

Energy-Related CO₂ Emissions by Scenario



Note: INDC Scenario models the future emissions pathway if nationally determined contributions (NDCs) are fully implemented; INDC (Ex-US) Scenario assumes a business-as-usual pathway for the US; Two Degree Scenario models the future emissions pathway consistent with global temperature rises of no more than 2°C above pre-industrial levels.

Sources: Moody's Investors Service, Carbon Dioxide Information Analysis Center, International Energy Agency, U.S. Energy Information Administration

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US climate policy cannot be viewed in isolation, however. There is a risk that other countries might reduce their commitments to emissions reduction should the US significantly back away from its existing climate policies. Such a scenario would potentially drive a much more substantial upwards shift in the future emissions pathway towards the global "business-as-usual" trajectory.

Additionally, the existing NDCs are insufficient to meet the Paris Agreement's ultimate goal of keeping global warming to less than 2°C above pre-industrial levels. Potential changes in US climate policy could therefore slow momentum for future global commitments to meet the 2°C target.

While acknowledging these risks, we believe that powerful structural forces at play, including robust institutional and private sector momentum, will continue to drive global sustainable and climate agendas regardless of the direction of US federal climate policy. As such, the effects of carbon transition will continue to have material credit implications for rated entities in a number of industrial sectors globally.

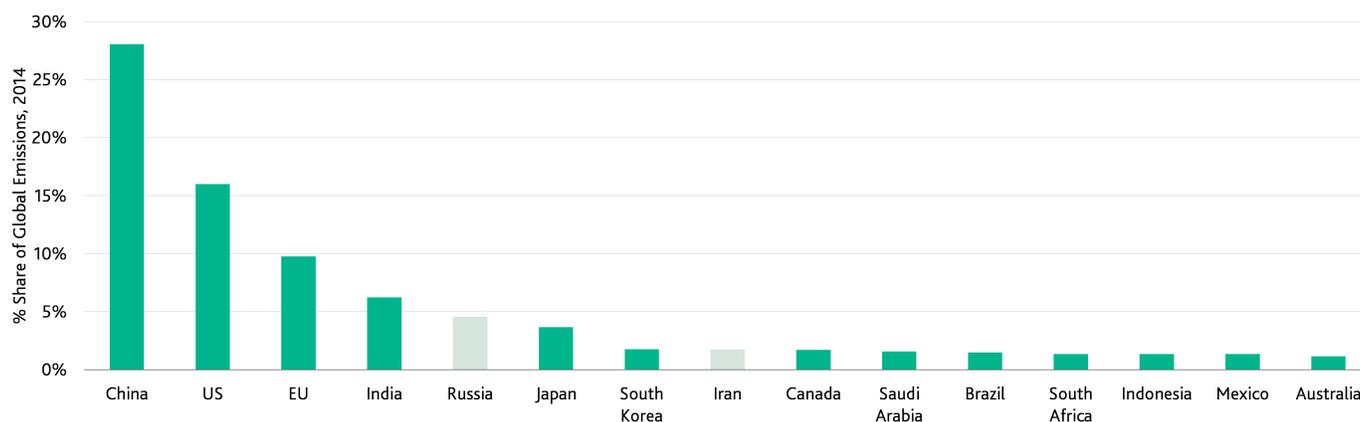
Most countries have reaffirmed their Paris Agreement commitments since the US elections

There has been little evidence of a weakening of global commitment to the Paris Agreement in the aftermath of the US elections.

As Exhibit 2 illustrates, a majority of the world's largest carbon-emitting economies have now ratified the Paris Agreement. And the other three largest emitting economies—China, the EU and India—have shown commitment to the climate agreement since the US elections.

Exhibit 2

Paris Agreement Illustrates a Near Universal Commitment to Greenhouse Gas Reduction Global CO₂ Emissions, % Share (2014)



Note: Dark green denotes that Paris Agreement has been ratified, light green denotes that Paris Agreement has been signed but not yet ratified.

Sources: Moody's Investors Service, International Energy Agency, United Nations Framework Convention on Climate Change

In accordance with the Paris Agreement, China aims to peak its greenhouse gas emissions by 2030 or earlier and its carbon intensity (carbon emissions per unit of GDP) by 60%-65% below 2005 levels. And in early 2017, Chinese President Xi Jinping urged global leaders to preserve their commitments to the Paris Agreement at the World Economic Forum meeting. Furthermore, following the completion of a successful pilot programme, China intends to launch a nationwide emissions trading scheme (ETS, or "cap-and-trade" scheme) later this year. Given its status as the largest carbon emitter globally, any meaningful pullback in commitments from China would have a significant impact on the future global emissions pathway.⁶ Indeed, it was symbolic that China and the US decided to jointly submitted their ratification of the Paris Agreement on the same day.⁷

In Europe, the Second Report on the State of the Energy Union, released in February 2017, reported that Europe is well on track to meet its 2020 climate and energy targets. Between 1990 and 2015, the EU's GDP grew by 50%, while greenhouse gas emissions decreased by 22%.⁸ And during the UN Climate Change Conference in Marrakech (COP22) in November 2016, several countries, including [Germany](#) (Aaa stable), announced ambitious climate strategies out to 2050, beyond the initial scope of NDCs pledged as part of the Paris Agreement. Meanwhile, the [United Kingdom's](#) (Aa1 negative) commitment to the Paris Agreement is unlikely to be affected by

its prospective departure from the EU, given that the country ratified the agreement in its own right and, as such, will remain bound independently following "Brexit".

India's commitments under the Paris Agreement are focused on reducing the emissions intensity of its GDP by 33%-35% by 2030 from 2005 levels. To meet this objective, the country reiterated its commitment to install 175 gigawatts of renewable energy by 2022, up from 43GW in Q1 2016, in its Draft National Electricity Plan published on December 2016.⁹

Finally, the Climate Vulnerable Forum (CVF), a group of 48 of the world's most climate vulnerable nations, pledged to various long-term objectives at COP22, including a commitment to update NDCs as early as possible before the 2020 timetable and a pledge to aim for 100% renewable energy. The CVF includes many smaller, emerging market sovereigns—such as [Fiji](#) (B1 positive) and the [Maldives](#) (B2 stable)—that our research has identified as particularly susceptible to the physical effects of climate change.¹⁰

Such developments support our view that the adoption of globally coordinated and effective policies to reduce greenhouse gas emissions and promote low-carbon technologies will continue regardless of US federal policy. While US leadership in global climate negotiations has been important to date, there is a risk that the federal government will become increasingly marginalised on climate policy issues should it look to temper its Paris Agreement commitments of reducing greenhouse gas emissions by 26%-28% below 2005 levels by 2025.

Sub-national green initiatives will be important in moving national policies forward, including in the US

Policymaking at a state and local government level will play an increasingly important role in fulfilling national climate commitments, including in the US.

Initiatives such as the Under2 Coalition demonstrate an increasing commitment to climate action at a sub-national level. A total of 167 sub-national jurisdictions, spanning 33 countries and six continents, have either signed or endorsed the Under2 memorandum of understanding, which commits them to reducing their greenhouse gas emissions by 80%-95% of 1990 levels, by 2050. Collectively, the Under2 Coalition covers around \$25.9 trillion in GDP, equivalent to more than a third of the global economy.¹¹

The ability and willingness of individual US states to enact climate legislation and commit to carbon reduction will vary, but this has been the case for some time. For example, in the absence of a nationwide ETS scheme, a number of states have set up cap-and-trade programmes, either as a collective (for instance, the Regional Greenhouse Gas Initiative made up largely of northeastern states) or individually (California).

While some states may look to follow the lead of the federal government in shaping climate policies, others are likely to maintain or advance existing initiatives. More than two dozen states have programmes in place to continue reducing emissions, while six states—including California and New York—have begun submitting emissions statistics to the global disclosure report published by the Compact of States and Regions (Exhibit 3).¹²

Exhibit 3

A Number of US States Are Disclosing Emissions Data

Government	Base Year	Latest Inventory Year	Latest GHG Emissions Inventory, mn tCO ₂ e	% Change from Base Year	% Share of National Emissions
California	1990	2014	441.5	2%	6.7%
Minnesota	2005	2012	140.1	-7%	1.7%
New York	1990	2014	223.2	-5%	3.0%
Oregon	1990	2013	58.9	5%	0.7%
Vermont	1990	2012	8.3	2%	0.1%
Washington	1990	2012	94.1	6%	1.4%

Note: Share of national emissions data are as of 2013.

Sources: Moody's Investors Service, Compact of States and Regions

Such initiatives in several key states will provide a countervailing influence, although they will inevitably have less of an impact than concerted policy efforts on a national scale.

Institutional focus on environmental risks and green finance will remain strong

Global climate policy is not limited to the Paris Agreement, and institutional efforts such as the G20 study group on green finance and the Financial Stability Board (FSB) task force on climate-related financial disclosures suggest that policy momentum on decarbonisation and green finance will be sustained.

On 14 December 2016, the FSB task force released its recommendations for climate-related financial disclosure, with the aim of developing a consistent set of standards and fundamental principles of disclosure.¹³ We believe that the application of these fundamental principles, combined with a standardised and consistent scenario analysis framework for disclosing climate related risks, by region, industry and time horizons, will enhance climate-related analysis and decision making. Despite their voluntary nature, adoption of the task force's recommendations will likely be strong given significant market focus and the FSB's success in other related areas, such as the Enhanced Disclosure Task Force in 2012, which looked to improve transparency and confidence in the global financial system. According to the FSB, 82% of firms claimed that they had fully implemented the recommendations on enhanced disclosures in 2015.¹⁴

Green bond issuance across the globe is another illustration of commitments on the part of the public and private sectors to the Paris Agreement. Green bond volumes continued to climb in 2016, reaching a new high of \$93.4 billion—an increase of 120% versus \$42.4 billion in 2015.¹⁵ Extrapolating this level of year-over-year growth could bring 2017 issuance to \$206 billion. January 2017 was already a strong month, with the French government issuing the second-ever sovereign bond and the largest green bond on record at €7.0 billion.¹⁶

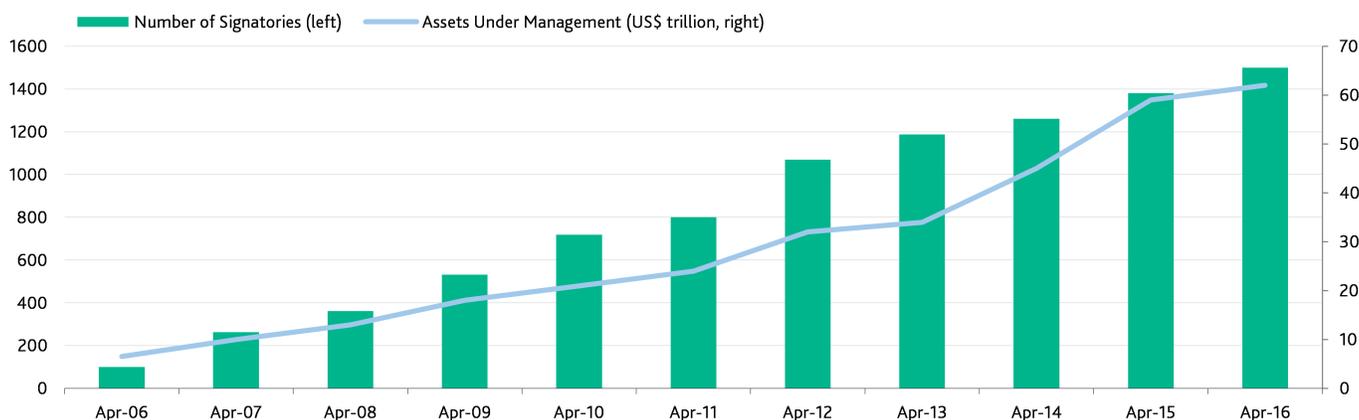
Finally, other regulatory initiatives beyond the Paris Agreement will also take effect in the coming years and support the transition to a lower carbon global economy. Examples include an agreement by the United Nations civil aviation agency on a new emissions standard for international airline flights, known as the Carbon Offsetting and Reduction Scheme for International Aviation, and a global deal announced in October 2016 to phase out the use of hydrofluorocarbons.

The number of private sector companies pursuing climate change strategies will continue to rise

Corporate leadership and institutional investor focus on carbon emissions reduction and broader sustainability issues is increasing. This is evident in the growing support for initiatives such as the Global Investor Coalition on Climate Change, We Mean Business and Principles for Responsible Investment (PRI), the latter of which is a UN-supported international network of investors in support of sustainable investment. As Exhibit 4 illustrates, the number of PRI signatories has risen more than fivefold over the past decade to 1,500, accounting for \$62 trillion in assets under management.

Exhibit 4

Number of Investors Committed to Sustainable Investment Is Rising Number of Signatories to the UN Principles for Responsible Investment



Sources: Moody's Investors Service, UN Principles for Responsible Investment

Strong institutional investor demand for greater sustainability and transparency, coupled with rising climate awareness and changing preferences amongst consumers, and technological change, will encourage a greater number of private sector companies to pursue explicit climate change strategies—both in terms of disclosing climate-related financial risks and setting targets for emission reductions.

Evidence of increasing corporate commitment includes the growth in companies disclosing on emission-related issues to the CDP (formerly, the Carbon Disclosure Project) and from those signing up to the RE100.

The CDP runs a global disclosure system that enables companies, as well as cities, states and regions, to measure and manage their environmental impact. In 2016, the CDP analysed 1,089 companies that disclosed climate-related data, representing 12% of global greenhouse gas emissions. Of the 1,089 companies, 85% have set emissions reduction targets.¹⁷

The RE100 is a global private sector initiative in which signatories commit to achieving 100% use of renewable electricity in their operations. As of January 2017, the RE100 included membership of 87 global companies, up from 15 in January 2015. Of the 87 companies, 11 had already reached their target of 100% renewable electricity before 2015, with a further 43 committed to achieving 100% renewable electricity by 2024.¹⁸

Prevailing market and technological trends support investment in less carbon-intensive initiatives

Finally, while national policy remains an important driving force, it represents only one of the key factors influencing the pace and magnitude of carbon transition for industries (Exhibit 5).¹⁹

Exhibit 5

Policy Represents Only One of the Transmission Channels of Carbon Transition



**Policy and Regulatory
Uncertainty**



Direct Financial Effects



**Demand Substitution
and Changes in
Consumer Preferences**



**Risk of Disruptive
Technological Shocks**

Source: Moody's Investors Service

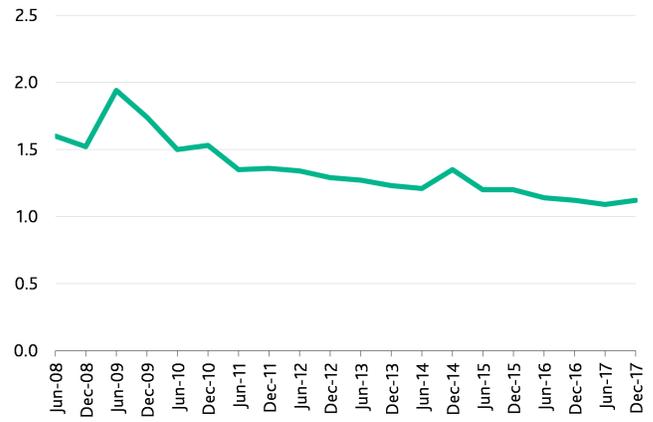
A number of non-policy drivers will continue to support decarbonisation trends in industries such as energy and automotives. Macroeconomic drivers include the ongoing shift from coal to gas and the declining cost and increasing efficiency of renewable energy. For example, according to Bloomberg New Energy Finance (BNEF), the average silicon solar module spot price fell to around \$0.40 per watt in 2016, down from \$1.70 in 2010. Similarly, the price of wind turbines has fallen by approximately 44% since 2008 (Exhibits 6 and 7). Going forward, the BNEF forecasts that the levelised cost of generation for onshore wind and solar photovoltaic will fall by 41% and 60%, respectively, by 2040, meaning that these two technologies would increasingly become the most cost effective way of producing electricity globally in the coming decades.²⁰

Exhibit 6
Costs for Solar Energy Are Declining...
 Average Silicon Solar Module Spot Price, \$ per Watt



Sources: Moody's Investors Service, Bloomberg New Energy Finance

Exhibit 7
.... As Are Those for Wind
 Wind Turbine Price Index, \$ million



Note: Bloomberg's Wind Turbine Price Index is based on data provided by 22 turbine buyers, as well as financial investors. It shows the contract prices signed for delivery in 12 months.

Sources: Moody's Investors Service, Bloomberg New Energy Finance

Moody's Related Research

- » [Environmental Risks – Sovereigns: How Moody's Assesses the Physical Effects of Climate Change on Sovereign Issuers, November 2016 \(1039339\)](#)
- » [Environmental Risks: Paris Agreement to Take Effect, Adoption of Carbon Reduction Policies to Accelerate, October 2016 \(1044876\)](#)
- » [Global Unregulated Utilities and Power Companies: Carbon Transition Brings Risks and Opportunities, October 2016 \(1030584\)](#)
- » [Environmental Risks: Automotive Sector Faces Rising Credit Risks from Carbon Transition, September 2016 \(1038590\)](#)
- » [Environmental Risks: Risks and Opportunities: What the Paris Agreement Means for Capital Markets, July 2016 \(1033890\)](#)
- » [Environmental Risks and Developments – Moody's To Analyse Carbon Transition Risk Based On Emissions Reduction Scenario Consistent with Paris Agreement, June 2016 \(1029574\)](#)
- » [Environmental Risks and Developments – Global: Paris Agreement Advances Adoption of Carbon Regulations; Credit Impact to Rise, April 2016 \(1024553\)](#)
- » [Environmental Risks and Developments FSB Task Force Could Begin to Clear Fog on Climate Risk Disclosures, April 2016 \(1022814\)](#)
- » [Moody's Approach to Assessing the Credit Impacts of Environmental Risks, November 2015 \(1010009\)](#)
- » [Environmental Risks: Heat Map Shows Wide Variations in Credit Impact Across Sectors, September 2015 \(1009845\)](#)

Endnotes

- 1 See <https://www.whitehouse.gov/america-first-energy>.
- 2 See <https://www.donaldjtrump.com>.
- 3 Article 28 of the Paris Agreement states that "At any time after three years from the date on which this Agreement has entered into force for a Party, that Party may withdraw from this Agreement by giving written notification to the Depository. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depository of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal." See [Adoption of the Paris Agreement](#), UNFCCC, December 2015.
- 4 We use the US Energy Information Administration's "AEO2016 Reference" case projection, which is a business-as-usual trend estimate, given known technology and technological and demographic trends. The main cases in AEO2016 generally assume that current laws and regulations are maintained throughout the projections.
- 5 See <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.
- 6 According to the International Energy Agency, China accounted for 29% of global carbon emissions in 2015.
- 7 See http://unfccc.int/paris_agreement/items/9444.php.
- 8 See http://europa.eu/rapid/press-release_IP-17-161_en.htm.
- 9 See [Draft National Electricity Plan](#), Government of India Ministry of Power, December 2016.
- 10 See [Environmental Risks - Sovereigns: How Moody's Assesses the Physical Effects of Climate Change on Sovereign Issuers](#), November 2016.
- 11 See <http://under2mou.org/the-mou/>.
- 12 See [Compact of States and Regions Disclosure Report 2016](#).
- 13 The task force's 32 members, including Moody's chief risk officer, were chosen by the FSB to include both users and preparers of disclosures from across the G20's constituency covering a broad range of economic sectors and financial markets.
- 14 See [Press Release: FSB publishes fourth EDTF report on bank risk disclosures](#), December 2015.
- 15 [Green Bonds - Global: Record Year for Green Bonds Likely to Be Eclipsed Again in 2017](#), January 2017.
- 16 See [Government of France: Sizeable and Long-Dated Green Bonds Improve Market's Liquidity](#), January 2017.
- 17 See <https://www.cdp.net/en/research/global-reports/tracking-climate-progress-2016>.
- 18 See [RE100 Annual Report 2017](#).
- 19 See [Environmental Risks: Moody's To Analyse Carbon Transition Risk Based On Emissions Reduction Scenario Consistent with Paris Agreement](#), June 2016.
- 20 See [Coal and gas to stay cheap, but renewables still win race on costs](#), BNEF, June 2016 and [The Shifting Economic of Solar Energy](#), Moody's Analytics, January 2017. Levelised costs take into account not just the cost of generating a marginal MWh of electricity, but also the upfront capital and development expense, the cost of equity and debt finance, and operating and maintenance fees.

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