

A photograph of a river in flood. The water is extremely turbulent, with large, churning waves and a thick, brownish-yellow color, indicating high sediment content. The river flows from the background towards the foreground. On the left bank, there are green trees and a dark rock. In the background, some buildings and more trees are visible under a slightly overcast sky.

FitchRatings

# Bank Climate-Change Stress Tests

Forcing Senior Management Awareness Is Just as Important as Sizing Risk



# Bank Climate-Change Stress Tests

Forcing Senior Management Awareness Is Just as Important as Sizing Risk

"Climate-change stress tests in the UK and France will not formally test banks' capital adequacy but will help drive sustainability objectives among banks' senior management. Prudential implications may follow."

Janine Dow, Fitch Ratings

## Greater Board Awareness a Major Benefit

Fitch Ratings believes that a major benefit from the forthcoming UK and French supervisory climate-change stress tests will be the increase in awareness of senior banks' management of how climate-related risk can in turn quantitatively increase credit, market, business and reputational risks.

This will force greater understanding of how such risks should be measured and managed through improved systems, processes and training. This, together with supervisory guidelines, should encourage management to adopt longer-term strategies which will improve the sustainability of banks' business models.

## Exploratory Tests with Broad Objectives

Banks will use their own data under a "bottom up" approach to run exploratory 30-year climate-change scenarios set out by the Bank of England (BoE; launch delayed until 2H21 and we expect results in 2022) and by the Banque de France (results in April 2021). Quantifying the extent of potential climate-related disruption to revenue, asset value and capital is integral to the tests.

Testing will act as a regulatory learning exercise, broaden understanding of environmental risks among financial participants, stimulate discussion about business model vulnerabilities and the need to adapt, and draw attention to gaps in data and risk-management frameworks. In our view, climate-change risks may well feed into prudential capital requirements over time.

## Tests Should Improve Bank Disclosures

A review of climate-related disclosures published by leading EU and UK banks shows a high degree of inconsistency in the quality and detail of climate disclosures. Banks will gather climate data in a more standardised manner, as climate stress testing becomes more mainstream and market participants increasingly push for greater harmonisation across scenarios and economic variables.

It is likely that clear taxonomy of climate-sensitive assets, transparency initiatives and growing pressure from market participants should force clearer, more consistent climate disclosures from banks in the medium term.

## Results Will Influence Holistic Capital Needs

The UK and French exercises will not formally test banks' capital adequacy nor be used to set capital requirements, but it is likely that the outcomes will influence how much capital banks need to set aside for Pillar 2 risks. The ECB is already guiding the large banks that it directly supervises to include physical and transition climate-related risks in their Pillar 2 capital adequacy assessment.

The European Banking Authority (EBA) is considering including climate-change sensitivities into the 2021 EU-wide stress tests for the first time. We believe outputs from climate stress tests will gradually be incorporated into capital requirements.

## Related Research

[Climate Change and the Coronavirus Pandemic: Coronavirus Crisis Response May Accelerate Energy Transition in Some Regions, Slow Others \(April 2020\)](#)

[ESG Bites into Bank Lending to Corporates \(January 2020\)](#)

[Financial Institutions Interactive ESG Dashboard 2Q20 \(September 2020\)](#)

## Analysts



**Janine Dow**  
+44 20 3530 1464  
[janine.dow@fitchratings.com](mailto:janine.dow@fitchratings.com)



**Monsur Hussain**  
+44 20 3530 1793  
[monsur.hussain@fitchratings.com](mailto:monsur.hussain@fitchratings.com)

## EU and UK Lead on Climate-Risk Supervision

Central banks and other supervisory authorities are being encouraged to treat climate-change risks as financial risks and to integrate climate factors into their risk-management frameworks. Progress is being made globally, as highlighted by the Financial Stability Board's July 2020 report on financial authorities' experience of including climate risks in their monitoring of financial stability.

Developed-market supervisors, led by the EU and UK, appear most advanced in their efforts to quantify the assessment of climate-related risks to banks and insurance companies, with Japan recently unveiling climate-risk scenario analysis and stress tests for its largest banks (according to media reports). Several supervisors are also considering climate-risk and environmental stress testing, in line with recommendations made by the Network for Greening the Financial System (NGFS). Scenario analysis is integral to the tests.

### NGFS

The NGFS, formed in 2017, comprises a group of central banks and supervisors who voluntarily share best practices and contribute to the development of environment and climate risk management in the financial sector. It also mobilises finance to support the transition towards a sustainable economy.

## Lack of Standardised Data

The idea of measuring climate-related risk is still new and climate-change and environment risk modelling is complex. This reflects the high degree of uncertainty surrounding climate trends and the need to project over a long time horizon to match expectations that climate changes are likely to extend over decades. Numerous climate-risk models have been developed but they rely on different data sets and assumptions and will produce a wide range of variable outputs. This frustrates output comparison.

The NGFS has identified lack of data as a crucial element for effective climate-related and environmental risk analysis. To bridge these data gaps, the NGFS has set up a new workstream to identify what data is missing and determine whether it can be obtained. Regulatory stress testing will introduce some standardisation, at least at a national level, which we view positively. Banks will be tested from the same starting point and stressed under scenarios which ask the same "what if" questions.

## NGFS Facilitates Best-Practice Models

The NGFS published "reference" climate scenarios in June 2020 to help standardise central-bank and supervisory assessments of how climate risks could affect the economy and financial systems. Three central scenarios are based on climate policies introduced in an "orderly", "disorderly" and "hot-house world" manner, with an additional five alternate scenarios allowing central banks and supervisors to modify assumptions and visualise different outcomes. The NGFS will publish additional scenarios later in 2020, which should ensure that the scenarios remain relevant.

These are a good starting point and are already incorporated into UK and French tests. We expect that the NGFS' scenarios will

become the international standard for climate-change stress-testing exercises.

The NGFS simultaneously published a practical step-by-step guide for central banks and supervisors conducting scenario analyses. We believe the guide will be helpful in assisting supervisors to identify stress-test objectives, identify the highest-risk exposures and set requirements for each participant, based on the extent of each bank's risk exposure.

There is also guidance on scenario selection, impact assessment and the communication of results. Variables can be mixed and matched across the scenarios. The NGFS does not express any preference but highlights the importance of coherence. Selections will vary depending on whether the aim is to assess change over a short or long time horizon or to assess the impact across an entire banking sector (likely to require a less-granular focus) or on individual banks, or if supervisors are testing a financial sector's ability to adjust under plausible or worst-case climate-change scenarios, for example.

### What Impact Channels Do the Tests Consider?

Channels through which climate change could affect banks that are covered by the stress tests reviewed in this report generally include:

**Physical Risks:** Potential disruption to a bank's ability to generate revenue and profit, leading to a reduction in capital, arising from the physical impact of climate change on operations, workforce, markets, assets, infrastructure, raw materials and assets. Physical risks include event-driven risks such as droughts, floods and fires. They can also relate to longer-term changes in weather patterns and variability, triggering changes in rainfall, sea levels and temperatures.

**Transition Risks:** Potential impact of policies or technologies designed to mitigate physical climate-related risks, as well as changes in public sentiment, resulting in a loss of revenue and the risk that carbon-intensive assets require write-downs, forcing them to become "stranded".

Physical and transition risks create both market and credit risk as financial assets can lose value and business disruption increases loan losses and reduces collateral value, for example.

Climate-related risks to the real economy and their effect on financial-sector risks are also being considered. However, other risks, such as reputational risks and legal risks arising from increased litigation linked to environmental damage, do not appear to be specifically covered by the tests.

## UK Approach Seems Tougher

The approach taken by the BoE for its 2021 biennial exploratory scenario (BES) on financial risks from climate change seems tougher than the position of the Autorité de Contrôle Prudentiel et de Résolution's (ACPR; part of the Banque de France) on its climate-change stress test.

The BoE has made it mandatory for the largest banks and insurance companies to participate in the BES stress test, whereas participation of French banks in the ACPR test is voluntary. Our view is that giving banks the choice of whether or not to participate may dilute the value of the ACPR's test compared to the BES test, although much will depend on the final level of participation. In this regard, it is worth noting that large French financial institutions have considered climate risk in their risk management frameworks for several years.

The BoE's proposal to use static end-June 2020 balance sheets while projecting the impact over a 30-year period means that no allowance is made for the ability of banks' management to alter business strategy and reduce higher-risk exposures in the face of mounting climate risks. This will likely magnify the size of estimated risks and provide a near "worst case" view.

In contrast, the ACPR's 30-year stressed projections will be based on a static balance sheet but only until end-2025 (to assess short-term climate-change risks), with balance-sheet adjustments permitted thereafter to reflect management's response to the short-term shocks highlighted in end-2025 projections. Participants will be able to manage the impact of stresses on their capital positions and thereby generate outcomes which could show that solvency impacts are limited in the long term.

The ACPR has also stated that it wishes to help regulators assess whether the current regulatory framework is well suited to the supervision of the financial sector's climate-related risks, and if it is appropriate to capture such impacts through regulatory capital requirements.

Details of the BES scenarios will be issued in 2H20. An "orderly transition" scenario is used as the baseline scenario for the ACPR test and is based on France's national low-carbon strategic plan (the objectives of which are aligned with those of the 2015 Paris Accord).

Given the many uncertainties related to climate change and the unfamiliarity of running such long-term forward-looking tests, neither regulator will be looking to test participants' capital adequacy nor use test outcomes to set new capital requirements. Instead, the regulators intend the granular bottom-up tests to be learning exercises for themselves and the participants.

Data gaps will lead to ideas for how best to capture such data in the future, governance-framework weaknesses can be addressed and shortcomings uncovered in the tests' processes can be refined.

Although many larger UK and French banks already analyse flood and other climate risks faced by their retail mortgage portfolios, we expect additional sifting may be required under the stress tests as they force participants to consider a far broader range of risks. It is possible that many participants may not yet have modelled their corporate exposures to address potential climate-change risks to the level of detail regulators expect.

Both stress tests will force greater board and senior-management awareness of climate-change risks and stimulate ongoing discussion at these levels. They will also require the recognition of business-model vulnerabilities to climate change and reduce risk appetite for sectors presenting higher environmental challenges.

We also anticipate the tests to stimulate an additional focus on longer-term sustainability objectives which should, over the medium to long term, prompt banks to consider reducing their exposures to sectors with high ESG risks.

BoE versus ACPR Tests		
Authority	UK - BoE	France - ACPR
Scope	Largest banks and insurers	Banks and insurers
Inclusion	Mandatory	Voluntary
Balance-sheet reference	End-June 2020	End-2019
Period	30 years (to 2050)	30 years (to 2050)
Balance-sheet assumption	Static	Static until end-2025; dynamic from 2026
NGFS scenarios	Build on NGFS	NGFS used as a starting point
Calculation	Uses internal models (bottom-up approach)	Uses internal models (bottom-up approach)
Capital impact	None	None
Results due	2022	April 2021
Public disclosures	Yes, in aggregate; not at firm level	Yes, in aggregate; not at firm level

Source: Fitch Ratings, BoE, ACPR

The two tests and their approaches are broadly similar despite the differences mentioned in the table on the left. Both look out over 30 years, are informed by the NGFS scenarios and aim to increase awareness of climate risk in the financial sector and help financial institutions learn how best to fully integrate these risks into their risk management frameworks.

### Top-Down versus Bottom-Up Approaches

- Top-down stress-testing approaches refer to assessments where risk outcomes are directly calculated by the regulators or supervisors (based on inputs provided by participating firms). In contrast, participants compute stress outcomes using bottom-up approaches.
- Each approach has its advantages and disadvantages. Top-down tests tend to rely on standardised inputs, are quicker to complete and their results tend to be directly comparable across firms. They tend to work well when the objective is to stress for a particular event at a particular time. De Nederlandsche Bank's flood-risk stress test (2017) and transition risk assessment (2018) used a top-down approach and it published its findings in aggregate form, covering all Dutch banks. The ECB's Financial Stability Reviews often use aggregated high-level data (such as loans extended to carbon-intensive companies) to estimate high-level climate-related stresses on the financial sector. The World Bank and IMF use top-down assessments of environmental testing in conjunction with their frequent financial-stability reviews.
- In contrast, bottom-up approaches tend to be more granular (with more detailed risk outputs) and are more accurate at reflecting impacts to income-statement and balance-sheet items. Such tests can also cover a large number of participants since much of the work is delegated to the individual institutions.

### ECB Ties Climate Stress to Capital Adequacy

The ECB's guide (published in May 2020 and immediately applicable) sets out its supervisory expectations for banks to incorporate climate-related and environmental risks into their existing internal capital-adequacy assessment process (ICAAP).

ICAAPs are used to determine the extent of additional capital required to be held for holistic risks under the Pillar 2 regime. This makes the ECB the only regulator to date to clearly state that climate-change scenario analysis and stress testing should be explicitly tied to a bank's level of capital adequacy. The ECB's view is deliberately tough, in our view, to help drive the European Green Deal, presented by the European Commission at end-2019 and designed to achieve climate neutrality for the EU by 2050.

Banks will need to assess capital depletion arising from climate-change and environmental risks when they construct their baseline and adverse scenarios for stress-testing purposes, and should form an integral part of their stress scenarios. ICAAPs generally consider a three-year time horizon. However, the ECB guides that banks should also incorporate longer-term horizons, which are better-suited to assess climate risk, and environmental scenarios, quantifying the impact of such scenarios on their capital adequacy.

Regulators expect banks to consider severe financial and macroeconomic stress scenarios which should include the occurrence of unusual, yet plausible, environmental developments.

Banks will need to assess the impact of climate-change risks on their business strategy, business-model resilience, risk management and internal control frameworks.

The ECB recognises that there are climate-related data limitations and understands that tools to measure such risks are evolving rapidly. However, it expects banks to improve in this area and to invest in IT and external tools as required.

### 2021 EU Test May Consider Climate Change

The EBA, which is responsible for conducting the EU-wide bank stress tests, is considering extending the terms of the 2021 stress test to include some exploratory scenarios. For the first time, banks may have to adopt a longer-term, more forward-looking view and consider the risks to their business models and environment from climate change. If incorporated, this would represent a departure from the historic three-year time frame covered by the tests.

The EBA is also considering tying test results more closely to regulatory Pillar 2 capital determination. Supervisors already use test results to support their supervisory review and evaluation process assessments and banks use the outcome to complement their ICAAP and improve internal risk-management processes. The EU stress tests cover banks whose assets represent 70% of sector assets. UK banks will not be included in the 2021 test scheduled to launch in January 2021, with results published by end-July 2021.

### Disclosures Reflect Data-Collection Progress

We believe banks that are more advanced in their collection of climate-change related data, and whose risk-management frameworks already have clear processes for capturing these risks, are better placed to provide more meaningful disclosures of climate-change and environmental risks for their portfolios and to complete regulatory stress-testing exercises. In our view, French, Dutch, Spanish, and UK banks within the EU have good climate-change disclosures.

Disclosures from major EU and UK banks on how climate-change and environmental risks are incorporated into their overall risk-management framework vary. The majority of references focus on general principles and high-level objectives. This is understandable given that disclosure is undertaken on a voluntary basis and banks are at different stages of climate-change awareness and learning curves. However, financial disclosures lack precision and standardisation, making comparison across banks difficult for market participants attempting to estimate the impact of climate-change balance-sheet stresses and shocks.

The EU is helping standardisation by supplementing its June 2019 guidelines on non-financial reporting with reporting on climate-related information. The guide includes an annex tailoring disclosure recommendations and key performance indicators (KPIs) for banks.

The EU's recommendations are comprehensive, including that banks disclose details of their loans and investments perceived as contributing to climate change, disclose assumptions for climate-change scenario testing and indicate climate-change financial risks in their ICAAPs.



## Standards Will Improve Bank Disclosures

The voluntary disclosure standards from the Task Force on Climate-Related Financial Disclosures (TCFD) and regulators encourage large banks to set KPIs to assess and manage their relevant climate-related risks and opportunities.

However, few banks are disclosing their core climate-related metrics and targets and the lack of standardisation remains a big problem, making comparison across banks difficult. This includes KPI disclosures for fairly basic environmental data, such as Scope 1, 2 and 3 greenhouse gas (GHG) emissions and percentages of assets exposed to physical risks or with a high probability of becoming stranded.

The use of climate-change scenario analysis to disclose assessments of climate-related issues is a core TCFD recommendation. However, responses to previous surveys conducted by Fitch indicate that climate-change scenarios are only used by the largest banks (with total assets in excess of USD500 billion) operating in developed markets. We found that roughly half of global systemically important banks either use climate-change scenario analysis or are working towards this.

However, momentum towards greater clarity is increasing. Climate-related disclosure for Dutch banks ABN Amro Bank N.V. (A+/Negative) and ING Bank N.V. (AA-/Rating Watch Negative, or RWN) is already of a high standard. Several banks, including HSBC Holdings plc (A+/Negative), Banco Santander, S.A. (A-/Negative) and Lloyds Banking Group (A+/Negative), have promised greater granularity and quantitative information from 2020.

Alignment with international guidelines and frameworks such as the Sustainability Accounting Standards Board and the UN Environmental Programme Financial Initiatives is also increasing and all major banks we reviewed<sup>a</sup> are committed to alignment with the 2015 Paris Accord goals.

In addition, several banks – including Banco Bilbao Vizcaya Argentaria S.A. (BBB+/Stable), Banco Santander, S.A. (A-/Negative) and Societe Generale S.A. (A-/Stable) – participated in working groups contributing to the development of voluntary guidelines for banks on the application of the EU taxonomy. We expect this to substantially increase standardisation of disclosure on climate-change risks.

<sup>a</sup> ABN AMRO, Barclays Bank plc, Banco Bilbao Vizcaya Argentaria, S.A., Banco Santander SA, BNP Paribas S.A., Commerzbank AG, Credit Agricole, Deutsche Bank AG, HSBC, ING, Intesa Sanpado S.p.A., Lloyds, Societe Generale and UniCredit S.p.A.

## Comparison Obscured by Variance in Climate-Change Risk-Management Approaches

Few of the banks that we have reviewed have fully integrated climate-change risks into their risk-management frameworks. The ECB's report on banks' ICAAP practices published in August 2020 says that almost a third of the 37 banks reviewed have not even considered climate-change risks in their risk-identification process and that this is "rather concerning".

Reviewing banks' climate-change related scenario analyses reveals that while transitional risks are generally captured, physical risks relating to climate change are much less likely to be incorporated. Furthermore, the results of climate-change scenario analyses are not always fully disclosed.

At a high level, all banks set limits for counterparties and sectors associated with high environmental impacts and many name the sectors and produce documents to explain why limits are in operation. Banks generally provide historic data but few prior periods are covered (since the data has only been gathered recently) and not all banks provide comparable data.

For example, most Western European banks are no longer financing new thermal coal projects, but banks quote their exposures to such portfolios using a number of different measurements and precise figures are sometimes unclear. Many banks list areas of sustainable finance, such as renewable energy projects, infrastructure and technology to support GHG emission reduction programmes etc, which they actively target for growth.

As banks adopt a variety of mechanisms for addressing the integration of climate-change risk into their risk frameworks, comparing the merits of different approaches is complex. The ECB's June 2020 guide on climate and environmental risks provides examples of different approaches but no guidance as to how it ranks the different approaches.

For example, Natixis S.A. (A+/RWN) – part of Groupe BPCE (A+/RWN) – classifies assets according to an internal environmental rating scale. Inputs to the scale consider factors such as a loan or investment's water usage, pollution and waste generation, and impact on biodiversity. Assets which score badly are penalised and assigned higher analytical risk weightings. This affects capital allocation, decisions regarding future loans and investments in similar assets, and divestment decisions.

Another bank differentiates default probabilities of assets based on its assessment of the fallout from a range of physical and transition risks. Another approach is to develop a sustainable-risk score card, which sets different risk weights for assets depending on the outcome score.

BNP Paribas S.A. (A+/RWN; BNPP), for example, maps identified climate risks to specific economic sectors and performs sensitivity analyses to estimate the occurrence probability of such risks.

Credit Agricole (A+/Negative) already maps its environmental risks, such as GHG emissions and water management, by economic sector and geography using a framework used to calculate the bank's exposure to climate transition risk. Physical climate risks are also being mapped in this way in 2020.

Deutsche Bank AG (BBB/Negative) increases default risk and or valuation losses on exposures to clients and assets that may be affected by climate-related physical or transition risks, including the emergence of disruptive technology or business models and shifting market sentiment societal preferences.

Banco Santander incorporates relevant social, environmental and ethical behaviour issues into its "materiality matrix"; a risk-management tool it applies across its entire value chain. The matrix already considers responsible business practices, addressing climate change and supporting the "green transition".

---

Intesa Sanpaolo S.p.A. (BBB-/Stable) only started work on identifying the potential financial impact of business sectors in its loan portfolio most affected by transition and physical climate-change risk in 2019.

Climate-change risk-management functions at UniCredit S.p.A. (BBB-/Stable) appear to be still at an early stage given that the bank assessed the impact of transition risk for corporates only in 2019 and conducted only a preliminary assessment of physical risk triggered by potential rising sea levels in its retail mortgage book.

Data regarding the emissions of banks' customers varies considerably. Several banks explain that they are collecting data extracted from detailed climate-risk questionnaires sent to major counterparties. Progress is patchy, as often the questionnaire process appears to be relatively new, having been initiated in 2019. Disclosure is often inconsistent, making it difficult to draw meaningful comparative conclusions. For example, the progress of Barclays Bank plc's (A+/RWN) "credit lens" questionnaire appears to be well-advanced and it is already applicable to all counterparties operating in high-risk sectors with exposures in excess of GBP5 million.

HSBC, on the other hand, reports that only 34% of questionnaires sent to carbon-intensive customers had been completed by end-2019. While isolated disclosures make for interesting reading, standardised comparative data across banks would allow analysts to draw clearer relative conclusions in terms of evaluating risks to the banks' credit profiles.

All banks disclose their own data regarding factors such as GHG emissions, energy consumption, car and air travel, water and waste. However, the measurements they use can differ and a bank's own consumption is a very small share of its overall climate-change risks, meaning the data is of very limited use for bank analysts and investors.

ALL FITCH CREDIT RATINGS ARE SUBJECT TO CERTAIN LIMITATIONS AND DISCLAIMERS. PLEASE READ THESE LIMITATIONS AND DISCLAIMERS BY FOLLOWING THIS LINK: [HTTPS://FITCHRATINGS.COM/UNDERSTANDINGCREDITRATINGS](https://fitchratings.com/understandingcreditratings). IN ADDITION, RATING DEFINITIONS AND THE TERMS OF USE OF SUCH RATINGS ARE AVAILABLE ON THE AGENCY'S PUBLIC WEB SITE AT [WWW.FITCHRATINGS.COM](http://WWW.FITCHRATINGS.COM). PUBLISHED RATINGS, CRITERIA, AND METHODOLOGIES ARE AVAILABLE FROM THIS SITE AT ALL TIMES. FITCH'S CODE OF CONDUCT, CONFIDENTIALITY, CONFLICTS OF INTEREST, AFFILIATE FIREWALL, COMPLIANCE, AND OTHER RELEVANT POLICIES AND PROCEDURES ARE ALSO AVAILABLE FROM THE CODE OF CONDUCT SECTION OF THIS SITE. FITCH MAY HAVE PROVIDED ANOTHER PERMISSIBLE SERVICE TO THE RATED ENTITY OR ITS RELATED THIRD PARTIES. DETAILS OF THIS SERVICE FOR RATINGS FOR WHICH THE LEAD ANALYST IS BASED IN AN EU-REGISTERED ENTITY CAN BE FOUND ON THE ENTITY SUMMARY PAGE FOR THIS ISSUER ON THE FITCH WEBSITE.

Copyright © 2020 by Fitch Ratings, Inc., Fitch Ratings Ltd. and its subsidiaries. 33 Whitehall Street, NY, NY 10004. Telephone: 1-800-753-4824, (212) 908-0500. Fax: (212) 480-4435. Reproduction or retransmission in whole or in part is prohibited except by permission. All rights reserved. In issuing and maintaining its ratings and in making other reports (including forecast information), Fitch relies on factual information it receives from issuers and underwriters and from other sources Fitch believes to be credible. Fitch conducts a reasonable investigation of the factual information relied upon by it in accordance with its ratings methodology, and obtains reasonable verification of that information from independent sources, to the extent such sources are available for a given security or in a given jurisdiction. The manner of Fitch's factual investigation and the scope of the third-party verification it obtains will vary depending on the nature of the rated security and its issuer, the requirements and practices in the jurisdiction in which the rated security is offered and sold and/or the issuer is located, the availability and nature of relevant public information, access to the management of the issuer and its advisers, the availability of pre-existing third-party verifications such as audit reports, agreed-upon procedures letters, appraisals, actuarial reports, engineering reports, legal opinions and other reports provided by third parties, the availability of independent and competent third-party verification sources with respect to the particular security or in the particular jurisdiction of the issuer, and a variety of other factors. Users of Fitch's ratings and reports should understand that neither an enhanced factual investigation nor any third-party verification can ensure that all of the information Fitch relies on in connection with a rating or a report will be accurate and complete. Ultimately, the issuer and its advisers are responsible for the accuracy of the information they provide to Fitch and to the market in offering documents and other reports. In issuing its ratings and its reports, Fitch must rely on the work of experts, including independent auditors with respect to financial statements and attorneys with respect to legal and tax matters. Further, ratings and forecasts of financial and other information are inherently forward-looking and embody assumptions and predictions about future events that by their nature cannot be verified as facts. As a result, despite any verification of current facts, ratings and forecasts can be affected by future events or conditions that were not anticipated at the time a rating or forecast was issued or affirmed.

The information in this report is provided "as is" without any representation or warranty of any kind, and Fitch does not represent or warrant that the report or any of its contents will meet any of the requirements of a recipient of the report. A Fitch rating is an opinion as to the creditworthiness of a security. This opinion and reports made by Fitch are based on established criteria and methodologies that Fitch is continuously evaluating and updating. Therefore, ratings and reports are the collective work product of Fitch and no individual, or group of individuals, is solely responsible for a rating or a report. The rating does not address the risk of loss due to risks other than credit risk, unless such risk is specifically mentioned. Fitch is not engaged in the offer or sale of any security. All Fitch reports have shared authorship. Individuals identified in a Fitch report were involved in, but are not solely responsible for, the opinions stated therein. The individuals are named for contact purposes only. A report providing a Fitch rating is neither a prospectus nor a substitute for the information assembled, verified and presented to investors by the issuer and its agents in connection with the sale of the securities. Ratings may be changed or withdrawn at any time for any reason in the sole discretion of Fitch. Fitch does not provide investment advice of any sort. Ratings are not a recommendation to buy, sell, or hold any security. Ratings do not comment on the adequacy of market price, the suitability of any security for a particular investor, or the tax-exempt nature or taxability of payments made in respect to any security. Fitch receives fees from issuers, insurers, guarantors, other obligors, and underwriters for rating securities. Such fees generally vary from US\$1,000 to US\$750,000 (or the applicable currency equivalent) per issue. In certain cases, Fitch will rate all or a number of issues issued by a particular issuer, or insured or guaranteed by a particular insurer or guarantor, for a single annual fee. Such fees are expected to vary from US\$10,000 to US\$1,500,000 (or the applicable currency equivalent). The assignment, publication, or dissemination of a rating by Fitch shall not constitute a consent by Fitch to use its name as an expert in connection with any registration statement filed under the United States securities laws, the Financial Services and Markets Act of 2000 of the United Kingdom, or the securities laws of any particular jurisdiction. Due to the relative efficiency of electronic publishing and distribution, Fitch research may be available to electronic subscribers up to three days earlier than to print subscribers.

For Australia, New Zealand, Taiwan and South Korea only: Fitch Australia Pty Ltd holds an Australian financial services license (AFS license no. 337 123) which authorizes it to provide credit ratings to wholesale clients only. Credit ratings information published by Fitch is not intended to be used by persons who are retail clients within the meaning of the Corporations Act 2001.