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Analyses et synthèses

French banking groups facing climate change-related risks

ACPR
BANQUE DE FRANCE

GENERAL OVERVIEW

How do French banks prepare for climate change and where do they stand in implementing the provisions of Article 173 of the French Act on Energy Transition for Green Growth?

To answer these questions, the ACPR sent a new questionnaire to the main French banking groups during the summer of 2018 and subsequently organised bilateral interviews from September to November 2018. This survey helped to draw an appraisal of progress achieved by banks since the publication of a report to the government in March 2017, which dealt with practices of the banking sector in managing risks related to climate change.

This "*Analyses et Synthèses*" displays our main findings. It also specifies the risks to which banking groups are exposed.

The publication is organised around the following issues:

- Are climate change-related risks included in the strategic orientations of French banking groups? Are these strategies compatible with the Paris Agreement and the National Low-Carbon Strategy? Are decision-making bodies regularly kept informed? What are the metrics used for strategic steering, the possible setting of objectives and the operational modalities?

- Are climate change-related risks considered as a new class of risks or do they represent factors influencing the traditional categories of prudential risks (credit, market, liquidity, etc.)? What are the risks to which banks are exposed and how do they address in particular physical risks, transition risks and liability risks associated with climate change? What progress has been achieved since 2016 and what are the innovative approaches developed by institutions to manage these risks? Where do institutions stand regarding the possibility of conducting climate stress tests?

The main observations can be summarized as follows:

- In general, there is progress in addressing climate risk at the level of the group strategy, some of which are associated with divestment commitments to some industries with high greenhouse gas emissions. Some institutions, characterised as "advanced" in this study, started developing certain metrics to steer progressive "decarbonation" of their portfolios. Reference is often made to the Paris Agreement even though an alignment of the group strategies to the 2°C Global Temperature Target is not always explicit or operational. In addition, institutions barely refer to the National Low-Carbon Strategy.

- Previously, climate risk was principally a concern only for the CSR function within banking groups, mainly from a reputational risk perspective. However, there is today a growing recognition of climate change-related risks by risk management functions, underlining the fact that these issues are now considered beyond the CSR function. This evolution is reflected in some institutions by an increasing quantification of risks and exposures and early sensitivity analyses of portfolios.

With regard to the three main categories of climatic-change related risks, one can note:

• **Physical risk.** Banking groups appear to have relatively little exposure to physical risk on the basis of currently available scenarios and expected impacts, as exposures are mainly concentrated in low-vulnerability geographical areas. However, the industry seems to be more aware that the full risk is not necessarily and fully transferable to the insurance sector. Nonetheless, the available examples of extreme episodes show that the latter did not lead to material consequences on banking risks. Progress is still necessary with respect to the granularity of data collected on the location of exposures and the difficulties, associated in particular with the organisation of information systems, to consolidate this information at the group level. Physical risk should not indeed be underestimated, even though its horizon of materialisation is generally foreseen in the medium term (10-15 years). For example, the rivers' low water level in Europe during the 2018 summer, especially the Rhine, disrupted river transport and supplies in Germany or Switzerland. From a more general view, the already observed effects of climate change on infrastructure or the environment are also new risk factors for the financial position of governments.

• **Transition risk.** Achieved progress in this area was more significant as banking institutions consider themselves being more directly exposed to this risk. However, this trend is unevenly distributed across banking groups. Based on data submitted by banks, we observe a reduction in exposure to sectors which are the biggest emitters of greenhouse gases between 2015 and 2017. Nevertheless there is no evidence that this decline is systematic and will be lasting. At the same time, supervisory data related to large exposures monitoring, which are available through 2018, exhibits a stabilisation, even in some cases a slight increase in exposures. Institutions underlined that the horizon for transition risk is much closer to the one underlying their strategic thinking. Despite their uncertainty, this is in line with climate scenarios which imply carbon neutrality to be achieved between 2030 and 2050 in order to comply with the Paris Agreement objective. Institutions also consider the main source of materialisation of transition risk to be the implementation of credible public policies (energy tax). However, they do not seem to consider that an adjustment could occur through an endogenous and abrupt correction in financial markets. In this area, room for progress is therefore also considerable and supervisors, through sensitivity or stress testing exercises, could serve as catalyst.

• **Liability risk.** Most of respondents consider not to be exposed to this risk in a material manner. However, the number of litigations is increasing at the international level and institutions can only be encouraged to seize this topic.

This paper concludes with a number of recommendations to regulators and supervisors on the one hand, and banking institutions on the other hand, to encourage the diffusion of best practices and a better consideration of climate change-related risks.

Keywords: Climate change; banking regulation; stress testing.
JEL codes: G 21, G 28, Q 54.

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Introduction

The issue of *Analyses et Synthèses* has two main objectives.

• Firstly, to assess the implementation of the provisions of Article 173 of the Act on the Energy Transition for Green Growth (ETGG) by the large French banking groups. This exercise is also part of the supervisory and surveillance tasks entrusted to the Autorité de Contrôle Prudentiel et de Résolution (ACPR). It complements a first set of observations included in the report submitted in March 2017 to the Government which was elaborated under the provision V of the TECV Law[1] under the lead of the French Treasury.

• Secondly, to bring insights to the works of the Network of Central Banks and Supervisors for the Greening of the Financial System (NGFS – see **box 1**), which was initiated by the Banque de France at the One Planet Summit in December 2017 and to which the ACPR contributes. Two of the objectives of this network are: i) to develop best practices in terms of monitoring the climate change-related risks in the financial sector, ii) and to analyse the transmission channels of climate-related shocks to the financial system in order to develop sensitivity analysis exercises and stress tests focused on financial institutions.

Similar work, conducted in parallel with the insurance industry, was performed by the ACPR and is exposed in a companion issue of "*Analyses et Synthèses*".

Finally, this publication is part of an overall strategy of the Banque de France and the ACPR. The latter pursues the objective of considering climate change-related risks and of fostering the orderly transition towards a balanced and sustainable economy, while preserving financial stability. This is illustrated for instance by: the recent publication of the Responsible Investment Charter,[2] which does applies to the management of both Banque de France's own funds' and pensions liabilities-related portfolios (the asset portfolio held by it in the context of monetary tasks entrusted to the Eurosystem is therefore excluded); or the partnership signed with I4EC (Institute for Climate Economics), a think tank created by the *Caisse des Dépôts et Consignations* and the *Agence Française de Développement*.

In a first part of the report, we lay down some methodological aspects of the survey as well as the climate change-related risks

1 Assessment of climate change risks in the banking sector. https://www.tresor.economie.gouv.fr/Ressources/File/433386

2 https://www.banque-france.fr/evenement/charte-dinvestissement-responsable

to which French banking groups are exposed. The second part sets out the strategies implemented by banking groups to respond to climate change-related issues and how they adapt and take these risks into account in their day-to-day management. The third part provides several recommendations to supervisors and banks to improve the awareness and the management of climate change-related risks.

Box 1

Network for Greening the Financial System (NGFS) [3]

The Network for Greening the Financial System (NGFS) is an initiative of the Banque de France, launched at the *One Planet Summit* in Paris on 12 December 2017. It aims at promoting the emergence of recommendations addressed to the whole financial system as well as best practices among supervisors and central banks. The commitment of the Banque de France on these issues is based on two firm convictions:

- Climate change-related risks are long-term risks to financial stability. The NGFS's work intends therefore to gain a better understanding of how these risks affect the financial sector in order to develop tools that will help both their identification and their prevention.

- The transition towards a low-carbon economy is a financial challenge that requires massive capital mobilisation and a qualitative challenge to avoid the risk of greenwashing.

To support Governments, which are responsible for public energy policies, the Network is committed to strengthening the necessary global response to the objectives of the Paris Agreement. To concur to the achievement of this ambition, the major challenges faced by central banks and supervisors is the fostering of an orderly and healthy development of green funding.

The institutions participating in the NGFS (30 members and 5 observers, spread over 5 continents as of the end of February 2019), on a voluntary and active basis, exchange experiences, share best practices, contribute to the development of climate and environmental-related risk management in the financial sector and mobilise the financial resources necessary to support the transition towards a sustainable economy.

3 https://www.banque-france.fr/node/50628

The NGFS appointed Frank Elderson, member of the Executive Board of the Central Bank of the Netherlands, as Chairman. The Banque de France is in charge of the Secretariat of the NGFS while its working groups are organised along the following three axes:

- Micro-prudential supervision and regulation (chaired by Ma Jun from the People's Bank of China),

- Macro-financial scenarios and impacts (chaired by Sarah Breeden from the Bank of England),

- Role of central banks in financing the transition (chaired by Joachim Wuermeling from the Deutsche Bundesbank).

The first NGFS report, representing a full year of work, will be published on April 17, 2019[4] within the context of the Paris international conference, and will highlight best practices to be promoted regarding the greening of the financial system.

4 NGFS has already published a progress report, «NGFS First Progress Report», October 2018. https://www.banque-france.fr/sites/default/files/media/2018/10/11/818366-ngfs-first-progress-report-20181011.pdf

Methodology of analysis and typology of climate change-related risks faced by French banking groups

Following the report to the Government entitled "The assessment of climate change risks in the banking sector" published in March 2017 in response to Article 173 of the Act on Energy Transition for Green Growth (**Box 2**), the ACPR elaborated, in liaison with the Banque de France, a questionnaire (see annex) to assess the progress achieved by French banking groups in monitoring the climate change-related risks.

1 Main findings of the March 2017 report and risk mapping

The lessons learned from this first report, published in March 2017, were as follows:

- Climate change-related risks (**Box 3**) were relevant but not necessarily significant in the immediate future, explaining a still limited monitoring within French banking institutions.

- Climate-related risks were mostly perceived to be covered by the traditional taxonomy of prudential risks: credit risk, market risk, operational risk, etc.

Physical risks appeared to be modest in the short term as institutions considered these risks as being covered by insurance companies or public mechanisms. In addition, their materialisation was expected over a horizon exceeding banks' financial planning horizon. For some institutions, the geographical diversification of their portfolio and of the activity of their largest clients were seen as significant mitigating factors for physical risk. A first calculation confirmed a modest exposure of French institutions: claims located in high vulnerability areas did not exceed 4% of the French banking portfolio.

Transition risk was considered potentially significant. Some institutions considered that the relatively short maturity of the funding granted, generally between 5 and 7 years would have shielded them against the financial consequences of the materialisation of transition risks while others considered that a lasting customer relationship, which would lead to the renewal of exposure, encouraging them to lengthen their strategic horizon beyond the average maturity of their exposures. Overall, this transition risk was quantitatively noticeable, with exposure to the most carbon-intensive sectors amounting to 12.7% of the total exposures of respondents.

Box 2

Main provisions of Article 173 of the ETGG Act

The Act on the Energy Transition for Green Growth (ETGG) sets the framework for France's low-carbon strategy. It anchors the main objectives of reducing greenhouse gas (GHG) emissions within the law. The objective of national energy policy is to reduce GHG emissions by 40% between 1990 and 2030 and then by a factor of four from 1990 to 2050. The law also lays down the main tools mobilized to achieve this goal, in particular by aiming at allowing diversification of France's energy mix and improving the energy efficiency of housing.

Several provisions of the ETGG Act concern information published by financial and non-financial firms.

- **Provision III of the Act refers to listed enterprises.** It requires them to specify in their risk disclosures their analysis of financial risks related to climate change, as well as measures taken to reduce them by implementing a low carbon strategy.

- **Provision IV introduces, for undertakings required to publish a CSR report** (corporate social responsibility), the reference of both the impact of their business activity and the use of goods and services they produce on climate change. The provision also extends the scope of information that is expected to feed disclosure-related publication about direct and indirect GHG emission over the entire added-value chain (upstream and downstream) of the firm.

Provisions V and VI specifically aim at promoting the integration of climate-related risks into the decisions of financial institutions.

- **Provision V of Article 173 concerns banks.** In its first subparagraph, this provision adds to the explicit enumeration of risks subject to prudential supervision, those which would be "highlighted in the context of regular stress tests". The second subparagraph entrusts the Government with a "report on the implementation of a regular stress test scenario representative of climate change-related risks". Similar to the rest of the article, provision V aims at encouraging credit institutions to engage in further reflection on the challenges associated with climate change and to find ways to address them.

• **Institutional investors and asset managers are subject to provision VI.** It extends to the former provisions that already applied to the latter (Article 224 of the National Environmental Commitment Act (ENE Act or "Grenelle II") of July 12, 2010) and specify them for all these institutions: they are expected to report on how they take into account environmental, social and governance criteria (ESG) in investment policy with a greater level of detail on climate change-related aspects. An implementing decree specifies the framework of this reporting. The aim is to foster private ownership of climate-related issues (and more generally ESG), and thus to contribute to the emergence of best practices in a rapidly changing field.

The challenges of climate change were mainly addressed from a reputational risk perspective. Few institutions had initiated concrete assessments of climate change-related risks. However, the report noted some initiatives related to CSR policies, with some institutions mentioning the inclusion of variables sensitive to climate change-related risks into client ratings or when assessing the decision to grant credit – mainly for project financing.

Sectoral policies also included climate-related risks but only indirectly. Alongside or as a feature of other risks (reputational risk for example), these risks could lead to setting limits to credit provisions by defining criteria for financing certain sectors deemed sensitive. These sectoral policies were usually elaborated with the CSR function and often addressed general environmental issues rather than climate change (biodiversity protection, pollution prevention, etc.). Most of them referred to common international agreement such as the Ramsar Convention[5] or the Ecuador principles.[6]

5 The Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) is an international treaty on the conservation and sustainable management of wetlands. It shall bind its members, including France, to: 1/to take into account wetlands in the development and use of their territories; 2/ identify significant wetlands, inscribe them on the Ramsar list and ensure their conservation; 3/ preserve all wetlands; 4/ cooperate with border countries to promote the conservation of cross-border wetlands.

6 The Ecuador Principles, created in 2003, constitute a framework for the financial sector. Voluntarily adopted by financial institutions, they aim at taking into account social and environmental risks in the activity of project financing.

Box 3

Typology of the studied risks

The taxonomy of the climate change-related risks is the one originally proposed by the Bank of England in September 2015:[7]

- **Physical risk** refers to direct losses caused by climate events. there are two subcategories: (i) chronic risks (rising oceans, increasing average temperature, etc.) which can progressively deteriorate the productivity of a given sector (agriculture for example); (ii) the risk of occurrence of extreme weather events, whose induced damage can lead to the destruction of physical assets (real estate and/or productive assets) and cause a fall in local economic activity and possibly a disruption of the value chain in specific parts (see impact of the flooding in Thailand on the regional automotive and IT sector). In this view, chronic risks may impact a larger share of banking institutions' portfolios. However, the gradual nature of the latter allows companies and subsequently banking institutions to adjust also gradually. This led the ACPR to focus its first reflections on the second type of physical risk without ignoring the first one.

- **Transition risk** derives from the economic and financial consequences of a sudden and unanticipated transition towards a low-carbon economy in order to contain global warming. In such circumstances, some sectors could suffer from a sharp depreciation of their assets (e.g. not to exploit the oil reserves, etc.), a diversion of consumers from carbon-intensive goods, or a sharp increase in production costs following the introduction of a carbon price or an energy tax. The economic and sectoral impact would affect financial stability and thus the banking system.

- **Liability risk** corresponds to the damages a legal person would be required to pay in case it is deemed to be legally responsible for the consequences of global warming.

Physical, transition and liability risks are relatively direct consequences of GHG emissions but there are they could affect biodiversity or health. At this stage, these issues are not yet integrated into the provisions applied to financial institutions or as financial stability issues.

7 Cf. Mark Carney (2015) : « *Breaking the tragedy of horizons-climate change and financial stability* », https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability

2 Methodology adopted

In addition to the work carried out in the course of 2016, a new questionnaire was sent to nine French banking institutions in the course of summer 2018: BNP Paribas, Groupe Crédit Agricole, Groupe BPCE, Société Générale, Groupe Crédit Mutuel, Groupe La Banque Postale, HSBC France, Agence Française de Développement and Caisse des Dépôts et Consignations. The two latter institutions are public, committed to the development and financing of long-term infrastructure. Therefore, they represent a very different risk profile from that of other banking groups, but experience in climate-related risk management may carry important lessons for commercial banks.

All these institutions account for 85.7% of the total balance sheet of credit institutions in France as of June 2018, i.e. total assets of around EUR 8.3 trillion.

The responses to this questionnaire then served as the basis for bilateral discussions with each institution in order to clarify and deepen their approach to climate risk. These interviews took place from September to November 2018.

Two aspects were examined in particular:

- **How management is organised within banking institutions to face climate change-related risks.** The interviews focused on the strategy deployed, the degree of involvement of decision-making bodies of the institutions concerned and the nature of the functions/tasks in charge of operational management of these risks.

- **The in-house exposure assessment of institutions to climate-related risks and how they measure them.** In particular, interviews focused on the tools used or under development to measure the sensitivity of portfolios or exposures to various forms of climate-related risk.

Data on exposures of the above-mentioned institutions (except CDC) have also been collected and are presented in this report. One should note that data are submitted by banks and are not systematically based on supervisory reporting. Banks' submissions are based on the NAVE rev. 2 sectoral breakdown. The induced granularity is therefore insufficient to perfectly identify counterparties vulnerable to climate change-related risks. Moreover, increasing the financing granted to a carbon-intensive corporate might not be necessarily negative for climate if the induced investment concurs to the ecological transition (through higher energy efficiency or other contribution to contain global warming).

In order to put these data into perspective, some overall data on climate change are presented along the risks they represent for the French banking system.

3 French banking institutions facing climate risks

3.1 A global warming, limited to 1.5-2°C in accordance with the Paris Agreement, would imply an increase in physical risk which would moderately affect French banking institutions

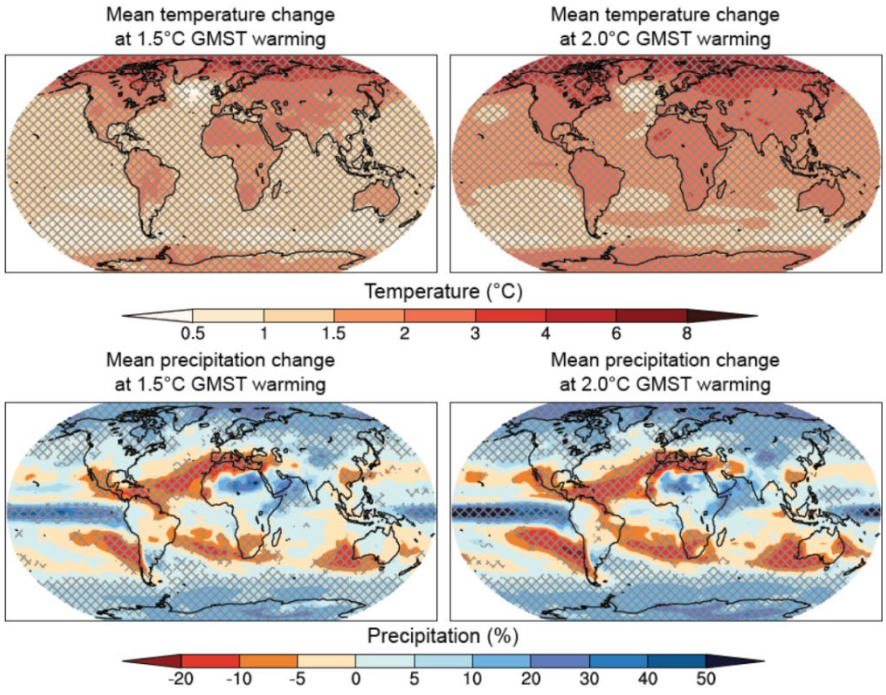
In its last work published in October 2018, the Intergovernmental Panel on Climate Change (IPCC) shows, based on 400 climate scenarios, that a global warming of only 1.5°C could significantly increase the risk and the impact of climate events (in particular drought and fire, coastal flooding, heavy precipitation, and heat waves). Global warming close to 2°C (which is more than a doubling of the observed warming to date) would naturally lead to even larger adverse outcomes (**Chart 1**). The increase in these risks would be differentiated across geographical areas depending on ecosystem characteristics. For example, for a similar temperature increase, drought impacts would be very different between Northern Europe and Mediterranean Europe.

Judging from exposures reported by French banking groups, they appear to be moderately exposed to physical risk but not fully spared. These exposures are typically located in temperate zones (**Chart 2**). For example, 75.8% of exposures are located in the European Union – 52.9% in France. Outside the European continent, the main source of exposure is located in the United States with slightly less than 10% of total

Chart 1

Temperature and precipitation developments in the 1.5 and 2°C scenarios

(Average developments over 2081-2100)

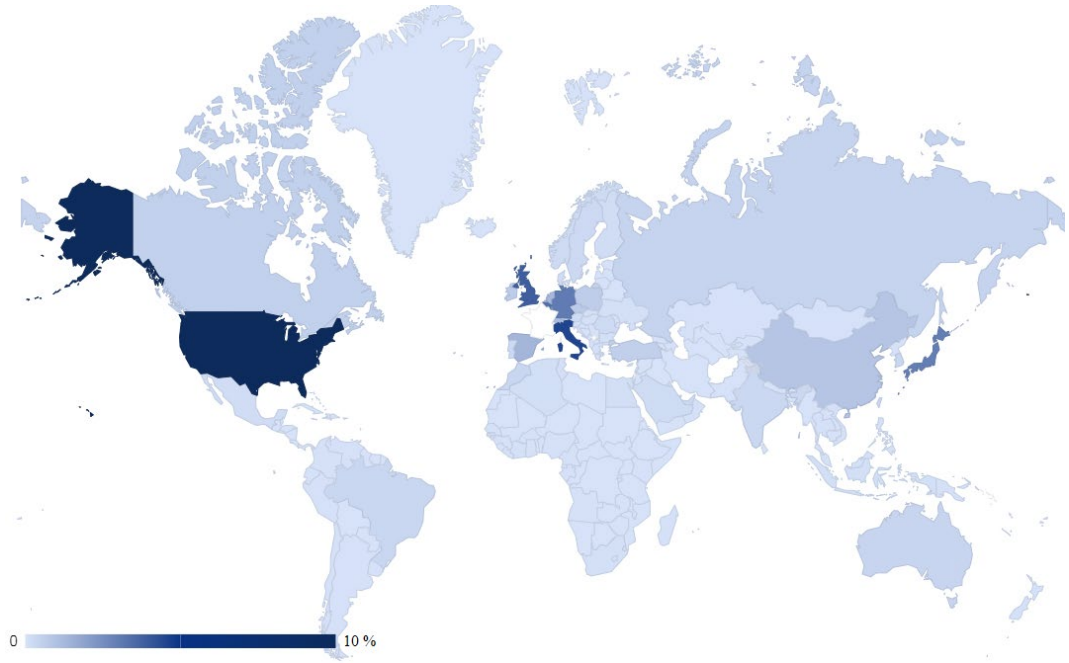


Sources: IPCC, "Climate Change 2018: Synthesis Report", 2018.

Chart 2

Allocation of gross financial claims by geographical area - outside France

(% of total gross financial claims as of late June 2018)



Sources: ACPR, data as of end-June 2018 on private banking groups which participated in the survey (BNP Paribas, BPCE, Crédit Agricole, Crédit Mutuel, HSBC France, La Banque Postale, Société Générale).

Note: given their over-representation in the balance-sheet of French banks, financial claims located in France were excluded from the map above. On this map, the darker the colour of a country is, the larger the exposure of French banks to this country is. The observed maximal exposure, which means the darkest colour in the map, reached 9.9% of total gross financial claims for United-States.

exposures. The remainder appear to be relatively marginal at the aggregate level but is not always fully negligible at the level of individual institutions.

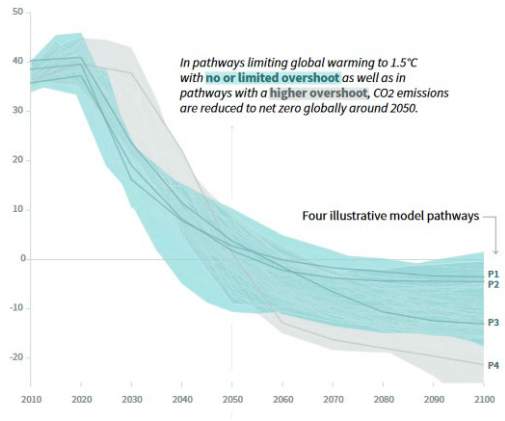
The materialisation horizon of this risk, generally in the medium term (10-15 years), should not, however, lead to its underestimation. It can indeed materialise faster than expected and also with unforeseeable ways (see the low level of European rivers in summer 2018 and its consequences on river and road transport, and the supply of companies, particularly in Switzerland and Germany).

3.2 The scenarios currently available confirm the necessity of a major transition to comply with the Paris Agreement over the next decade

While there are many uncertainties surrounding transition scenarios, the IPCC report shows that compliance with the Paris Agreement implies achieving carbon neutrality (i.e. zero CO2 emissions) over a very short horizon (generally between 2030 and 2050, see **Chart 3**). This horizon tends to be much less distant than those pointed by banks in bilateral discussions.

Chart 3

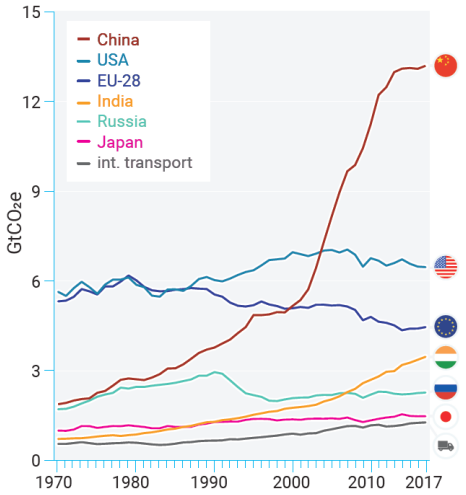
GHG emissions paths consistent with a global warming limited to 1.5°C



Sources: Global Carbon Budget 2018, IPCC, "Global Warming of 1.5°C.

Chart 4

GHG emissions evolutions by geographical area



Sources: EDGAR v 5.0/v 4.3.2 FT 2017 CO 2 (Olivier et al., 2018) and Global Carbon Project (Le Quéré et al., 2018).

3.3 Efforts to reduce CO2 emissions are unevenly distributed across countries

The group of Global Carbon Budget scientists estimates that greenhouse gas (GHG) emissions would have increased by 2.7% (with an uncertainty margin of more or less 0.9 ppt) in 2018. The increase would be particularly strong in India (+6.3%) and China (+4.7%) (**Chart 4**). Thus, these figures do not seem to suggest a significant bowing of the GHG emission path since the Paris Agreement at the global level. However, Europe and France, which account for slightly less than 1% of global emissions, appear to have started this climate transition even though a stabilisation, even a slight increase of emissions was observed in 2018. **Therefore, the effort to achieve carbon neutrality over a decade remains considerable and constitutes a source of risk in banking balance sheets, in particular with regard to transition risk.**

3.4 In France, the use of energy is the largest source of GHG emissions

According to figures published by the European Energy Agency, the use of energy is by far (with 70.3% of the total) the largest source of GHG emission in France, followed by agriculture (**Chart 5**). Transport is a major emission sector (29%), of which more than half (54%) comes from personal vehicles, as well as the residential-tertiary sector,[8] whose emissions are mainly due to heating (82%). GHG emissions from industry have declined by almost 50% in France since 1990, due to the combined effects of deindustrialisation but also improvements in energy efficiency. The role played by households in GHG issues does not always appear to be clearly perceived by banking groups whose activity is mainly oriented towards retail loans and located in France. Indeed, households would potentially be exposed to the implementation of carbon taxes, which could deteriorate their solvability and increase, for banks, their credit risk.

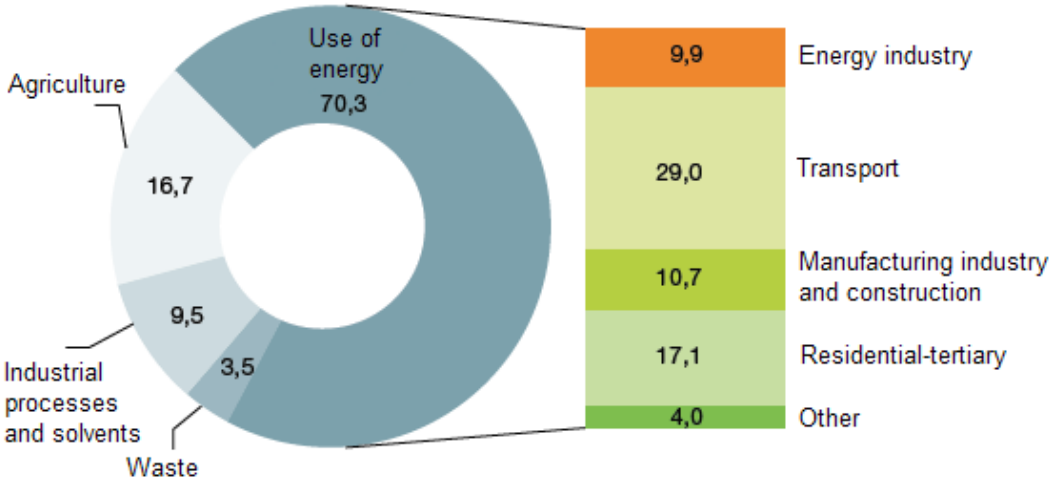
8 The residential-tertiary sector comprises households' energy consumption from the non-transportation tertiary sector.

Chart 5

Allocation of GHG emissions in France by economic activity, 2016

In 2016 the distribution by sector of activities was as follows:

In %



Sources: European Energy Agency - see "*Les chiffres clés du climat*», SDDS, 2018.

A growing but still heterogeneous ownership of climate change-related risks by French banking institutions

The survey and bilateral interviews conducted in 2018 with nine French banking groups highlighted the progress achieved since 2016 in integrating risks and opportunities linked to climate change in their governance, strategy and risk management.

1 Governance around climate change issues is being structured and gradually strengthened

1.1 Governance of banking groups and climate-related risks

Two trends in the banking industry reflect the progress achieved since 2016 in addressing climate change-related issues:

- **Increasing involvement of governance bodies at the highest level of decision** of banking institutions in managing climate change-related **risks**;

- A **process of progressive integration into the existing risk management framework** as well as the **construction of internal expertise and the development of dedicated tools** beyond the sole dimension of Corporate Social Responsibility "CSR".

These developments illustrate the shift in the perspective of banking institutions regarding issues linked to climate. Compared to 2016, banking institutions now seem to consider climate-related risks as a relevant source of financial risks. Therefore, these risks are being gradually integrated in the overall strategy and risk analysis of banks.

However, practices remain heterogeneous across the banking sector. Differences in the maturity of the climate change-related risk analysis tools reflect, in particular, the business model of institutions. Two categories of institutions can be identified:

- **"Advanced" institutions**, which exhibit approaches characterised by (i) governance bodies that now deal with climate change-related issues with a risk-based view; (ii) their integration into the internal risk management framework. Among these institutions, we typically find: (a) large banking groups with inter alia international financing and investment banking activities; (b) institutions with singular business model which, as a result, have a very successful approach to one of the two major climate change risks (physical or transition risk).

• **"Wait-and-see" institutions** where the "CSR" approach is still prioritized over the risk-based approach. These institutions are mainly domestic and retail-oriented. Their relative delay stems from a combination of factors: (i) a lack of internal resources granted to those issues which have not yet been considered as priority due to their lack of immediate materiality and (ii) methodological and regulatory obstacles (e.g. the absence of shared taxonomy).

1.1.1 In some institutions, governance bodies are now involved in monitoring climate change risks

• **Increasing information by decision-making and supervisory bodies.**

Governance bodies are now regularly kept informed about climate change-related issues and risks through their risk committees and not exclusively on the basis of the CSR framework.

In these bodies, climate-related risks are treated as "financial risks" and are closely monitored. This monitoring includes the review of sectoral portfolios to assess the exposure to related risks. In addition, risk committees hold regular meetings specifically dedicated to these new sources of risks.

This approach takes place at different levels of internal governance. In particular, CSR and Risk functions may have common working forums at the level of business lines. The collaboration between these two functions is intensifying and organised among "advanced" institutions. Within one of them, the risk management function was recently designated as a second line of defence for "CSR" risks.

• **Integration into the strategy of climate change risks.**

In the previous exercise, discussions revealed that the "strategic" orientations of banking institutions adopted by the management bodies tended to focus on business opportunities related to the fight against climate change. They aimed at increasing the supply of products and services compatible with the energy transition. Moreover, they were rarely conceived outside the "CSR" policy. These strategic orientations also referred to initiatives taken by institutions to reduce their environmental footprint as well as sectoral policies with broader objectives than combating climate change.

Among the "advanced" institutions, some are now taking into account the objective of reducing the carbon footprint of their credit portfolios in designing their strategic orientations. They generally mention the underlying objective of aligning their funding with the 2°C scenario defined by the International Energy Agency (IEA). The transition risk is therefore increasingly shaping the strategic orientations of these institutions.

This orientation also manifests itself in the renewal of their sectoral policies. They include new sectors (such as non-conventional hydrocarbons) or have been made more stringent (extension of relevant banking activities and upstream and downstream activities of companies in sectors) to limit institution's exposure to transition risk. Finally, these strategic orientations are now combined with metrics in order to monitor their implementation. These metrics are focused on transition risk,

including measures of the carbon footprint of the balance-sheet (via their exposure to corporates) by certain institutions and the monitoring of the relative share in their funded energy portfolio or specific sectors, such as energy generation from coal. These orientations can translate into limits to total credit provided to the coal extractive sector and could complemented by more specific metrics (e.g. the share of coal sector in the primary and secondary energy mix funded by the bank).

1.1.2 Towards an integrated approach to risks

• Within "advanced" institutions, the Risk Management function took over climate change issues.

Climate change-related risks are now being integrated into the risk management framework of some institutions. Therefore, they actively participate in the marketplace work and internally develop the expertise necessary to identify and manage these risks. For the most mature among institutions, climate change-related risks have recently been integrated into their risk classification and risk appetite framework. These risks are therefore not perceived as a specific risk but can be included in traditional categories of prudential risks (credit risk, operational risk and, to a lesser extent, market and liquidity risks).

The process for identifying and assessing climate change risks is carried out under the responsibility of the Risk Management function, based on dedicated indicators (**see part 2.2 for more details**).

• Within the "wait-and-see" institutions, the CSR framework remains the main pillar for the analysis of climate-related risks.

Indeed, if these institutions can also seek to reduce their exposures to counterparties operating in specific sectors, the decision to grant financing apply under the procedures and tools specific to the CSR. For institutions that have developed this type of approach, credit risk is assessed at the business relationship level via credit file ratings which include Environmental, Social and Governance Criteria (ESG), including climate indicators. Some institutions also take these aspects into account in their credit provision policies by reflecting the commitments set out in their sectoral policies through procedures at the business level that ensure compliance (due diligence). While the primary objective of their approach remains to control reputational risk, these institutions now recognise the materiality of climate change-related risks.

Some institutions have sometimes developed specific approaches that are not necessarily applicable to the whole group - for their asset management subsidiaries, especially in the context of the Socially Responsible Investment (SRI) policy or within their insurance subsidiaries (these specific tools are not covered in this report).

1.2 Climate-related risks governance could be strengthened

• The internal monitoring of issues linked to climate change has not fully emancipated the framework set by the CSR policy.

While some progress has been achieved since 2016, the strategic orientations related to climate change are still very broad, as they are tightly intertwined with the CSR strategy, and display a short-term horizon, i.e. over the horizon of financial and strategic planning (between 3 and

4 years). These are orientations often developed "at the margins" of the Group's financial strategy. The financial strategy of institutions does not allow the assessment of their resilience according to different climate change scenarios. The recognition of these risks in their financial strategy still remains limited, even though some institutions are considering reviewing their strategic and financial planning processes to ensure its compatibility with a low-carbon path, particularly at the national level.

For example, remuneration and training policies, which take into account climate change issues, do so exclusively with a "CSR" perspective. Therefore, the amount of variable compensation for certain employees depends on the achievement of GHG emission targets related to the own functioning of the institution and the amounts of funding devoted to renewable energy.

- **The implementation of these strategic orientations is not always operational.**

The strategic orientations, defined at groups' level, are rarely declined at the operational level, in particular through specific action plans and indicators. This results in high heterogeneity in the recognition of these risks by business. Because of this hiatus between "business" initiatives aimed at integrating climate-related issues into their operational process and the group's "hat" strategy, governance bodies do not benefit from exhaustive reporting of the actions implemented and thus cannot assess their effectiveness.

The steering capacity of the strategic orientations is also limited due to the early stage of development and insufficient granularity of the metrics. Only one institution has integrated into its risk appetite framework the metrics related to the implementation of sectoral policies associated with thresholds and limits. It gives rise to an escalation process in internal governance and corrective actions when the limit is breached.

- **The process of integrating climate risks would benefit from being strengthened.**

Institutions do not allocate significant human resources from the Risk Functions. Similarly, they do not mobilize all available risk assessment and management tools. In addition, climate-related risks are not yet fully identified and controlled by "the three lines of defence": indeed, the processes of the first line of defence (the operational line) do not always incorporate the analysis and assessment of these risks. The risk management and compliance function, which is the second line of defence on climate change-related risks, is rarely identified and no institution has a permanent monitoring or internal audit programme (the third line of defence, independent of the first two) on these risks. Finally, periodic review (internal audit) addresses these issues only from a "CSR" policy perspective.

2 Institutions are progressing but unevenly in the development of dedicated tools for climate-change related risk analysis

In these circumstances, institutions have continued or initiated, since the 2016 interviews, the analysis of their climate change risk exposures. This was accompanied by the development – also unequal – of specific indicators and methods of analysis. This section details the perception of the different climate change risks by

banking institutions and the main methodologies developed to prevent them.

2.1 Reflections of banking institutions on physical risk are still in the early stages of development

• More recognised as a relevant risk, its materiality remains perceived as modest by banking institutions.

Physical risk remains perceived as modest by most institutions. Compared with 2016, the ACPR's 2018 survey reveals that if the existence of the risk is more recognised, the perception of its materiality has not significantly changed. For example, questions about the risks and opportunities associated with climate issues that could relate to their business in the 2020 horizon, 4 private banking groups on 7 respondents discussed physical risk.[9] This risk is well documented in their internal documentation (in particular for their risk committee) but is often described in a very partial way.

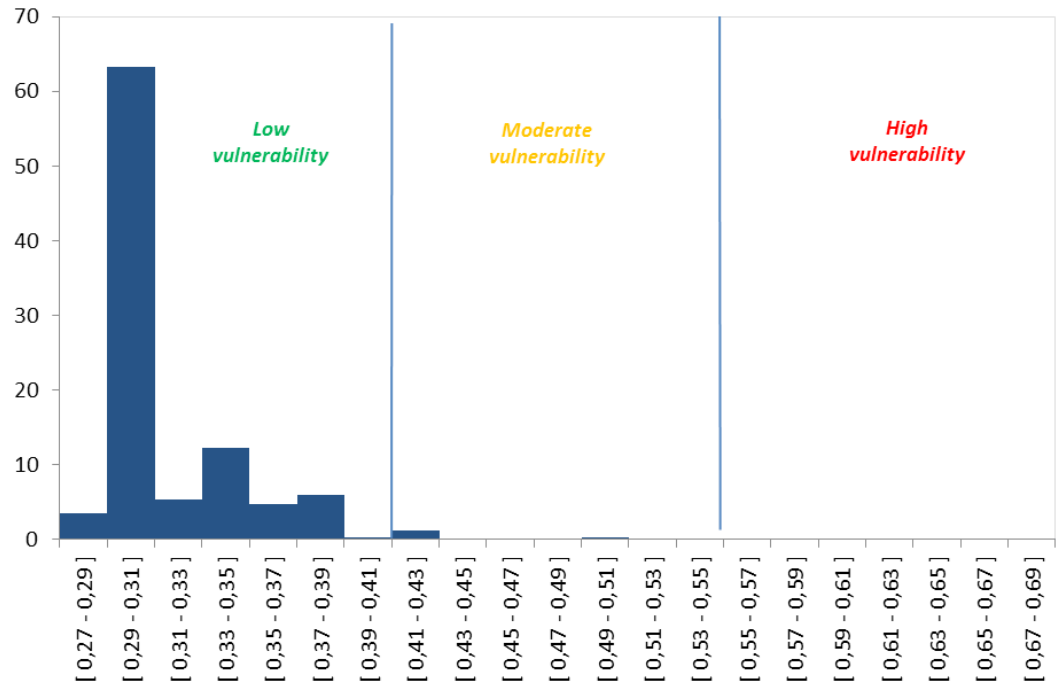
This low perception of risk is explained by a concentration of French banks exposures in areas less subject to physical risk. As can be seen from the **Chart 6**, 96% of total exposures of all commercial institutions involved in data collection are located in geographical areas considered not to be vulnerable to climate change.

9 A 5th institution mentions this in its internal risk framework but in a very brief manner.

Chart 6

Allocation of gross financial claims by climate vulnerability (ND-GAIN index)

(% of total gross financial claims as of late June 2018)



Sources: ACPR, data as of end-June 2018 on the 7 largest banking institutions located in France.

Note: the ND-GAIN Climate Change Vulnerability Index gives a score by country (Notre Dame University Indiana – Global Adaptation Initiative), which allows the distribution of exposures by intervals of vulnerability. The qualification of vulnerability (low, moderate, high) is simply a three-thirds breakdown of the range of values taken by the index. Gross financial claims included in the calculations include off-balance sheet items and are against all types of counterparties.

No institution presents a level of exposures in medium or high-vulnerability countries exceeding 4.6% of the portfolio.[10] One can observe – by calculating for each of them a vulnerability index weighted by his exposures in each country – a naturally higher risk exposure among institutions that are more internationally active. However, the indices obtained remain at very low levels (between 0.30 and 0.32)[11] and have been stable for all French banks in recent years (between 0.306 and 0.307 between the end of 2015 and the end of June 2018).

Moreover, regarding retail activity, French households have a strong insurance coverage against the consequences of natural disasters, which limits the potential losses for banks. Among exposures located in France (75% of retail exposures), the residential housing portfolio is widely protected from the consequences of natural catastrophe as most of households have underwritten an insurance contract on their main house. According to a 2011 INSEE study[12] based on relatively old data, 98% of the households in metropolitan France had insurance contract. Additionally, as a second line of defence, the regime of natural catastrophe,[13] ultimately guaranteed by the French State, ensures that insurers are able cover all claims.

Finally, corporate portfolios are considered diversified geographically and sector-wide by banks. The occurrence of multiple extreme weather events in several parts of the world within a limited time period is low. Therefore, it could be noted that, excluding real estate (which mainly represents exposures to households), non-EU and non-United States exposures (which represent 12% of the exposures to corporate) do not exceed 2% of total exposures to the different geographical areas considered in the survey.

- **Measures of physical risk exposure deserve further refinement.**

Physical risk exposure measures focus on the notion of exposure to a particular country. Two institutions assess physical risk exposures by classifying geographical areas by vulnerability. To do so, these two institutions rely in particular on the ND-GAIN index score. One institution combines country vulnerability with sectoral vulnerability (vulnerable sectors are identified using a KPMG study) to obtain a physical risk index for each pair (area/sector). The second institution intends to develop a predominantly a sector-based approach using a methodology that remains to be determined. These simple methodologies enable an early review of exposures. However, as underlined in the March 2017 report submitted to the Government, one needed to take into account the local dimension of physical risk and possible evolutions in insurance coverage in the context of climate change.

Banks have not started monitoring the risks associated with the insurance protection gap). While households in metropolitan France are largely covered against risks to their principal residence, the case of French overseas "*départements*" (DOM) shows that high insurance premiums in relation to the available income may lead to underinsurance (the coverage ratio is less than 50% in the DOM) and thus direct exposure of households to the financial consequences of natural disasters. Moreover, insurance coverage (whether on assets or on operating losses) of professionals and small and medium-sized enterprises is also uncertain.[14]

10 The qualification of vulnerability (low, moderate, high) is simply a three-thirds breakdown of the range of values taken by the index.

11 The highest vulnerability ratio is 0.67 and the lower is 0.27. If 100% of the exposures were located in the more vulnerable country then the index would be 0.67.

12 Calvert (L.) and Grislain-Letrémy (C.) (2011) "Home insurance in overseas départements: low subscription", Economy and Statistics No. 447.

13 https://www.ccr.fr/-/indemnisation-des-catastrophes-naturelles-en-france

14 For example, with regard to the agricultural sector, the Fédération française des assurances emphasises in its 2017 annual report the objective of 4.7 to 8 million hectares of insured agricultural land, which would only be 30% of the total surface area.

Box 4

The impact of the 2010 Xynthia storm on French firms

Extreme weather events have a significant cost to the economy not only because of the direct damages they entail but also because of the prolonged slowdown in economic activity they can cause. However, if physical damage can be insured, it is harder to hedge against a decline in demand or a rupture in the supply chain. Extreme weather events are therefore likely to lead to deterioration in the financial health of firms, which could weaken the banking system if it is followed by an increase in defaults. Since climate scientists expect an increase in the frequency of such events over the next few decades, the issue of assessing physical climate risk for banks is relevant for regulators.

The storm Xynthia, which struck France on February 26 and 27, 2010, could be considered as a natural experience to investigate this issue. Causing around EUR 2 billion of damages in France, the storm mainly affected the Vendée and Charente-Maritime where it caused large flooding. In the face of the magnitude of the caused damages, the French government recognised the status of a natural disaster and triggered a series of aid to support the population and the local businesses.

By comparing the temporal evolution of the probabilities of default of firms affected by Xynthia (the group called "treated") to similar firms not affected by the storm ("control" group), it is possible to assess whether this particular weather event led to an increase in corporate defaults. The firms of the "treated" group are identified as firms present in one of the cities directly impacted by the storm. The "control" group is constituted by selecting firms present in the same departments but in municipalities not directly affected by Xynthia and whose characteristics in January 2010 are similar to those of the entities of the treated group.

The control and treated groups had very similar debt and default dynamics prior to storm Xynthia, indicating that the treated and the control groups are comparable. The analysis does not reveal a significant increase in the probability of default of firms treated compared to the controlling firms after the occurrence of storm Xynthia. This is the case for short-term (18 months) or medium-term (36 months) dynamics.

The absence of increase in corporate defaults after storm Xynthia can be interpreted as reflecting the ability of the insurance system and state aid to support the local economic fabric in case of extreme weather events. Assuming that this ability will be maintained in the future, this would tend to minimise the importance of physical risk to banks. Conversely, lower insurance coverage or higher frequency of extreme weather events – with the consequence to lower insurability or, if not, at with an exorbitant price – would increase the direct and indirect effects of physical risk on bank portfolios.

These pockets of vulnerabilities could widen if insurers were to increase the pricing of contracts against an increase in natural disasters. At this stage, banks view this risk as limited – at least in the short term – and have therefore not started yet to monitor it.

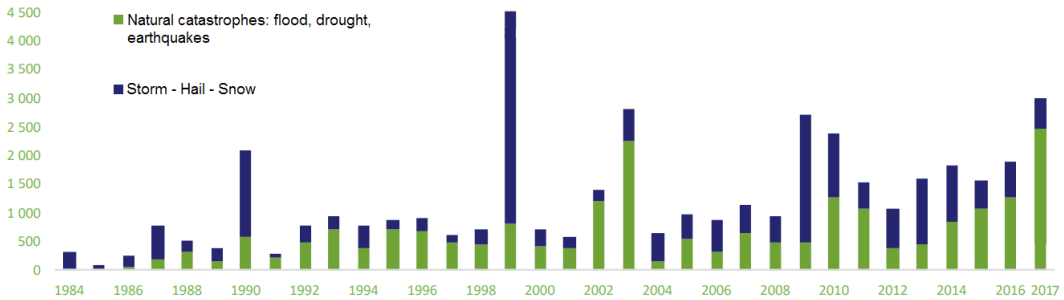
Moreover, the study of the impact of climate events on SMEs and French households did not reveal a significant impact on credit risk, including when the insurance coverage is very low (**Boxes 4 and 5**).

Box 5

The impact of Hurricane Irma and the role of insurance

The Fédération française des Assurances (FFA) notes in its 2017 Annual Report that claims paid by insurers to compensate for damages caused by weather events are increasing. Hurricane Irma largely explains this increase for 2017 with almost 25,600 claims and an estimated total cost of Euros 1.9 billion. The FFA report also notes that "*the extent of the damage exposed the vulnerability of these ultramarine territories: 45% of the housing and 40% of commercial undertakings in Saint-Martin were not insured*".

A permanent rise in the cost of natural hazard



Source: FFA in current M€

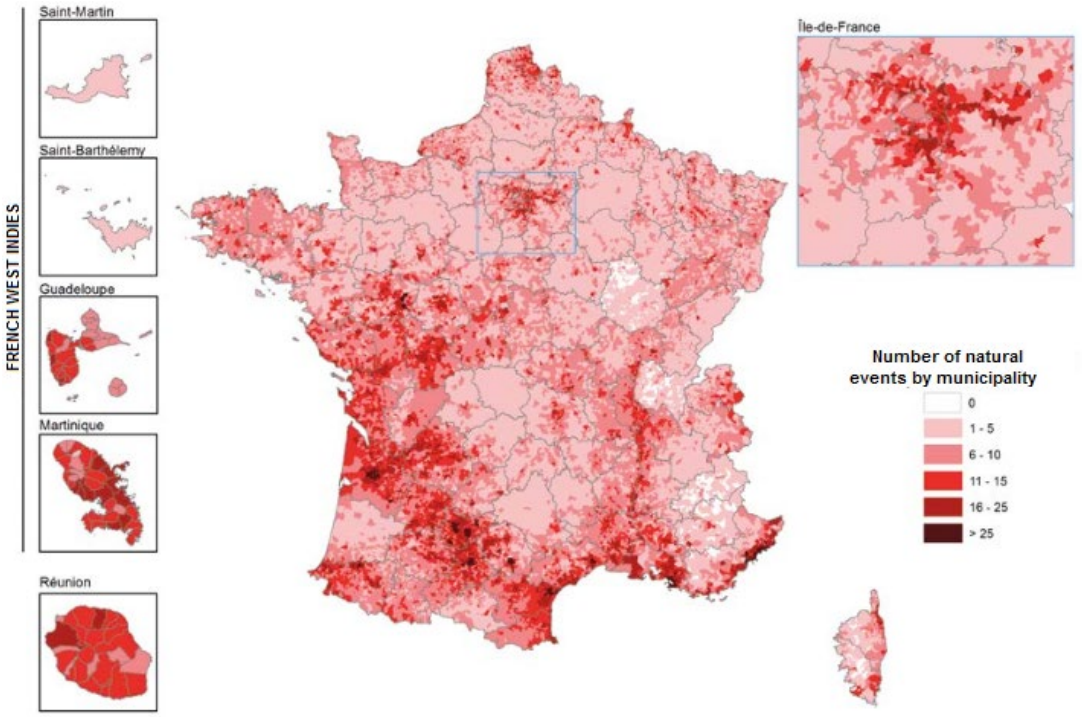
It is interesting in this context to learn that one of the banks interviewed has analysed the impact of this climate event on its credit risk. After significantly increasing its provisions for credit risk, the institution also offered repayment rescheduling. The credit risk situation did not deteriorate when payments resumed. To date, no rating has been downgraded, as evidenced by the average credit ratings (number and amount). This is valid for all asset classes. If an increase in litigations in the territory of Saint-Martin has been observed, the outstanding amounts are low and are in particular related to hurricane leaves without new address.

Institutions are considering how to collect relevant data to assess physical risk in a granular manner. It varies widely across regions or "*départements*" in a single country depending on the degree of concentration of insured goods and the inherent vulnerability to natural disasters. Measuring physical risk therefore requires the ability to locate firms' production assets and households' housing assets. In France, for example, natural disasters are more concentrated around the Mediterranean region, the north of the Aquitaine region and Ile-de-France (**Chart 7**). However, interviews with institutions reveal that in the case of housing loans, information on the precise geographical location of the funded property exists but is not necessarily aggregated in information systems. Only one institution has been able to assess on the basis of Météo France data the share of mortgage loans whose property was located in areas at risk. Several institutions indicated that they will increase efforts make this information systematically available in their systems. Regarding corporate exposures, the information is simply not available at Group level for many counterparties. However, several institutions mentioned their willingness to collect data on the largest customers.

Chart 7

Number of natural disasters recognised between 1982 and 2017 by towns

(Across all type of natural disasters)



Sources: Caisse Centrale de Réassurance, "*Bilan des catastrophes naturelles en France*" 1982-2017), June 2018.

• **Work to assess the impact on credit risk – for physical risk, new climate scenarios are emerging.**

Some banks have started reflecting – in particular through international working groups – to assess the impact on portfolios. "Advanced" institutions – whose risky exposures are relatively higher – have generally launched reflections aimed at linking climate change with credit risk. In particular, in order to provide a framework for concrete implementation of the TCFD recommendations by banks regarding physical risk, a working group with 16 major international banks (including BNP Paribas and Société Générale) was created under the auspices of UNEP-FI. The outcome of this discussion led to the publication of a report which provides an analytical framework for assessing the impact of physical risk on energy, agriculture and real estate portfolios (**Box 6**). The two institutions concerned indicate that they have launched work on the sectors abovementioned. The results are not available yet. In particular, the lack of data on the location of client assets complicates the implementation of this methodology.

By contrast, other "wait-and–see" institutions did not start such work. Generally reflecting a weak international exposure (especially outside Western Europe, see above), the latter have at best started piecemeal thinking about the relevance of physical risks but do not yet consider the impact of climate scenarios on the credit risk of their portfolios.

• **Finally, due to the specificity of its activity leading to greater exposure to countries vulnerable to climate change, the AFD is more advanced in setting up physical risk analysis tools.**

By the nature of its activity (provision of long-term funding – with maturities over 15 years, in developing countries), the exposures of the Agence Française de Développement (AFD) are much more concentrated in geographical areas vulnerable to physical risk. Under these conditions, the exposure-weighted average ND-GAIN index reaches 0.4 (compared with 0.3 on average for the 7 private institutions in our sample), which means that on average AFD exposures are located in areas that are moderately vulnerable to climate change.

In these circumstances, the AFD develops specific tools to assess the physical risk of territories. The AFD undertook a mapping of its credit portfolio exposure to physical risk (180 counterparties representing 80% of the exposures are involved). The vulnerability of geographical areas is assessed according to indicators reflecting extreme events or gradual evolution in climate-related conditions. The vulnerability of an asset is reckoned based on its location but the methodology does not allow catching the vulnerability related to the business sector or the supply chain of the debtor. The results of this mapping should enable the internal rating methodology to be adjusted in a second step so that it takes into account the physical risk in a qualitative fashion.

Box 6

UNEP-FI methodology for assessing physical risk[15]

The United Nations Environmental Programme Finance Initiative provides a methodology for assessing physical risk. The UNEP-FI recommends considering both changes in average weather conditions and the more frequent occurrence of extreme events.

Developments in average weather conditions such as higher temperatures or changes in rainfall can affect production and productivity while extreme events cause direct damages, changes in house prices and operating disruption.

Four climate change scenarios are offered with temperature increases of 2° and 4° over 2025 and 2045. The methodology presented by UNEP-FI estimates how these developments affect the probability of default (energy and agriculture sectors) and the loan to value ratio (real estate sector). At the sectoral level, physical risk affects productivity, leading to lower incomes and ultimately adversely affects the probability of default. These mechanisms are quantified in relation to the existing academic literature. Modelling of LTV dependence on extreme weather events relies on empirical studies measuring real estate price developments in the affected areas.

To implement these exercises, it would be necessary to improve the available data, in particular on the geographical location of borrowers, to improve macroeconomic models that integrate the impact of climate change and to anticipate difficulties that the insurance sector could experience.

Various case studies are presented. In particular, one could mention the impact of physical risk on the probability of default of the UBS loan portfolio of electric utilities. The impact on production capacity is estimated at around 15%. However, UBS challenged the final step of the UNEP-FI methodology, arguing that to infer a credit relevant impact on the probability of default, unrealistic assumptions are made, such as the lack of insurance, the assumption of fixed prices or the lack of government support.

The UNEP-FI methodology summarises the state of art in the field and summarises existing research. It does not allow substantial innovations but rather offers financial actors an analytical framework to assess their exposure to physical risk.

15 UNEP-FI (2018) : "Navigating a New Climate: Assessing Credit Risk and Opportunity in a Changing Climate», July.

2.2 Progress achieved in dealing with transition risk has been more significant while exposures seem to be broadly stable since 2010, with a slight reduction since 2015

• Transition risk is now explicitly mentioned as a potential risk to banking institutions.

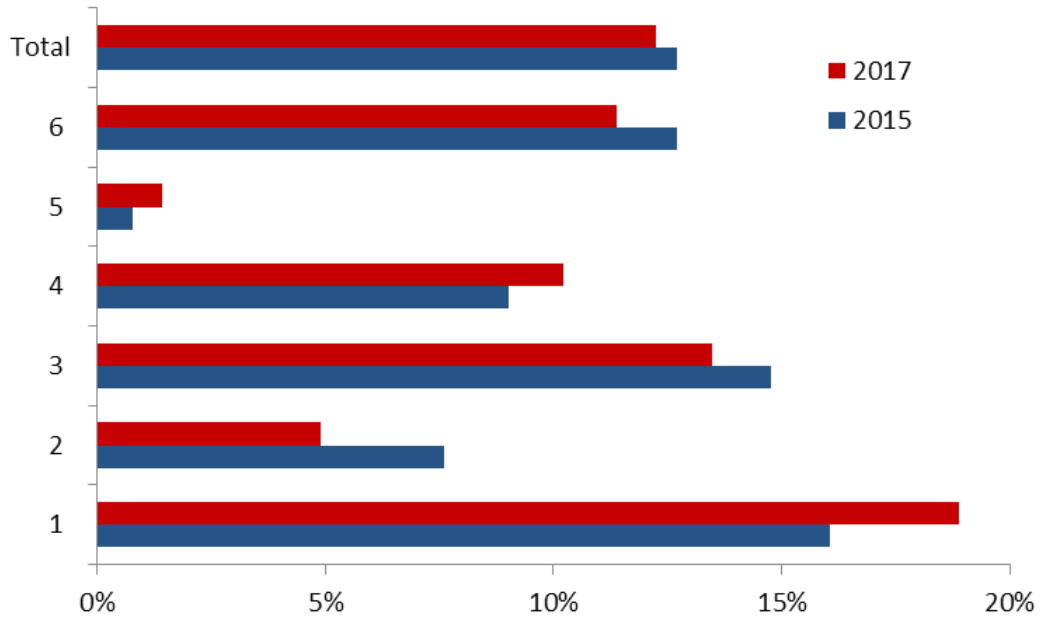
Compared with 2016, transition risk is now being integrated into the risk taxonomy of the major French banking institutions. 5 institutions[16] explicitly mention the transition risk in internal documents presented in their risk committees. Of these institutions, 4 of them pose the transition risk as relevant and potentially material. This results in the development of exposure measurement and further work to assess the possible impact on credit risk.

This greater ownership of transition-related risks naturally reflects a potentially significant exposure. Indeed, total exposures to sectors which are most important GHG emitters reached 12.7% of total credit risk exposures at the end of December 2015. The same figure is 12.2% at the end of December 2017 (**Chart 8**). Based on data submitted by banks, we therefore observe a reduction of exposure to the most carbon-intensive between the two dates. This decline reflects a relatively stable level of exposures (+1.8%) and a faster growth in total credit exposure (+5.6%). A distinction is made between "advanced" and "wait-and-see" institutions. The former typically exhibit a lower exposure (with a maximum of 8.1% of exposures) than the latter (above 10%). One should note that this approach is based on the Statistical classification of economic activities in the

Chart 8

Exposure to transition risk

(% of net outstanding exposed to credit risk)



Sources: Eurostat ACPR, data on 6 of the 7 largest banking institutions in France and participating in the interviews conducted in 2015 and 2017.

Note: The exposure to transition risk corresponds to outstanding in the first 20 sectors of the NACE rev 2 classification in terms of the issuance of Greenhouse Gases (GHG) per unit of value added (86% of greenhouse gas emissions in France in 2012 and 13.7% of the value added of the sectors). The automotive construction (C 29) and construction (F) sectors are then added: **see F. Lenglart et al.** "CO 2 issues of the economic circuit in France", 2010.

16 Another institution implicitly considers this risk by introducing regular reporting of its exposure to the most carbonated sectors - with the difficulty of assessing whether this corresponds to a risk or CSR perspective.

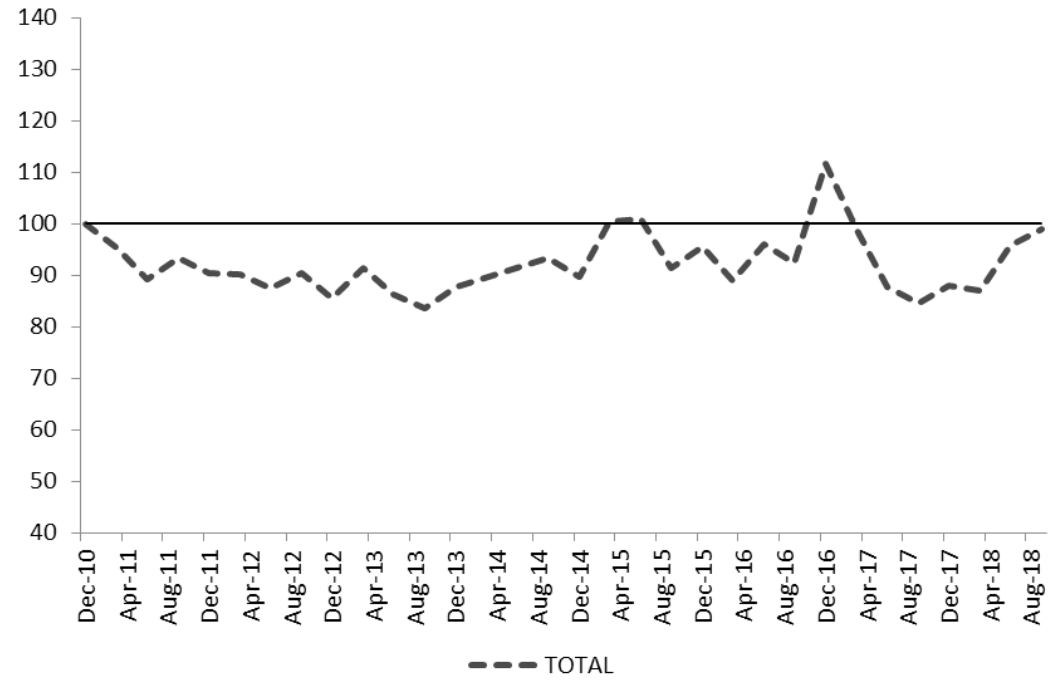
European Community (NACE) which lead to overestimate exposures of banks to transition risk. Indeed, within sector, there are activities or counterparties that are either unlikely to be affected by a transition towards a low-carbon economy or able to adapt without any significant financial damage. This highlights the need for taxonomy for sustainable and unsustainable activities. Additionally, granting more financing to an entity displaying an important carbon footprint is not necessarily negative from a climate point of view if the resulting investment foster the transition (case of an oil company investing heavily in renewables or when higher production of wind turbines does lead to higher steel production and therefore higher financing to the latter).

By focusing the analysis on exposures to fossil fuel-related sector, stabilization could be observed since 2010 although 2018 witnessed a slight rebound. The prudential reporting dedicated to large exposures allows for more granular analysis by singling out only companies whose main activity is related to extract or trade oil, gas and coal. Data available since 2010 for the 5 most important French banking institutions show that exposures to those counterparties are broadly stable in aggregate since 2010 (**Chart 9**). Nevertheless, a slight rebound could be observed in 2018. To assess the extent to which the evolution of exposures to fossil fuel-related activities is in line with the evolution of total lending activity of banks or reflects a reallocation phenomenon, it could

Chart 9

Evolution of gross exposures towards the fossil fuel energy sector in the large exposure reporting

(December 2010 = 100)



Source: ACPR.

Note: "Large exposures" data are collected when an exposure to a group of connected clients (control or and economic dependence) is above 300M€. It means that exposure to certain connected parties whose business is not to extract or trade fossil fuel energy sources are included if the highest entity of the group belongs to this sector. The economic activity classification does not rely on NACE code but is based on the "Industry Classification Benchmark" (ICB) to ensure homogeneity across reporting submitted by banks. It also allows singling out businesses whose main activity is related to oil, gas and coal. Exposures are expressed on a gross basis meaning before provisioning, the use of mitigation techniques and regulatory exemptions. Figures include not only debt claims but also guarantees, credit line, derivatives and shares. Debt claims account for a bit less than half of gross exposures

be noted that this stable level of exposures is combined with a lower share in total large exposures since 2014 (from 20% in December 2013 to 16.5% in September 2018 – **Chart 10**).

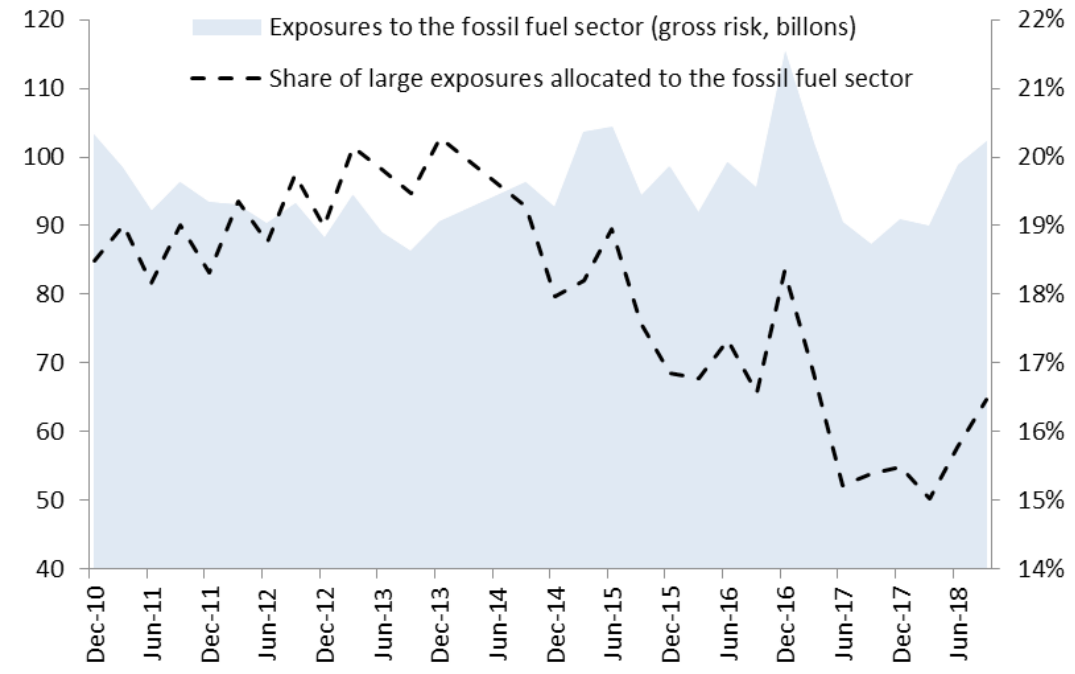
The origins of the materialisation of the risk of transition are still poorly identified. Among the most frequently discussed scenarios in the literature, the transition risk would be the result of a break in public climate policies (implementation of a global carbon price, introduction of binding regulatory standards, etc.), or technological break (carbon capture). The latest possibility would be a rapid change in consumer behaviour. Overall, respondents did not report a risk that a given scenario would have more chance of realising. By contrast, respondents consider that a sudden re-pricing of transition risk by market participants is limited. In other words, it seems that market participants expect that an exogenous shock is more likely to lead to a re-pricing of risk by financial markets (i.e. that would not be subject to a financial market dynamic). This confirms the need for supervisors to adopt a preventive approach to transition risk.

- **Institutions are gradually pursuing the development of transition risk tools but at different speeds.**

Interviews indicate that the majority of institutions have undertaken the development of tools to monitor transition risk. Work focuses on credit risk given its importance in bank balance sheets. There is, however, a strong heterogeneity according to the business models and the size of institutions (which overlap the distinction between "advanced" and "wait-and-see" institutions). In some cases, the

Chart 10

Share of gross exposures to the fossil fuel energy sector in the large exposure reporting



Source: ACPR.

risk measurement tools could feed either the general risk assessment of a given counterparty or sectoral reviews. The main methodologies are listed below by increasing degrees of sophistication. It should be noted that no bank has initiated concrete reflections on the implementation of stress tests across the group's portfolio.

A majority of banks have plans to develop a mapping of sectors vulnerable to transition risks and then monitoring associated exposures. Indeed, the first step is to define sectors that are most vulnerable to transition risk by accurately describing possible sources of shock and transmission mechanisms to usual risk parameters. 4 groups do or intend to conduct this type of analysis. These mappings, when they exist, are described in internal documents and rely on more or less sophisticated qualitative analyses. For example, an institution identified for 6 sectors (automotive, construction, electrical production, chemical industry and finally mining of ores) the possible origins of the sub-categories of transition risk (public climate policies, final demand evolution, technological risk, and legal risks). In the same institution, exposures to these sectors are monitored in the context of dedicated risk committees and specific limits (as a percentage of total outstanding amounts). Two other institutions also follow, through similar committees, their exposures to the fossil energy sectors (either through direct monitoring of outstanding amounts or through the monitoring of funded primary and secondary energy mix).

Several institutions indicated measuring or considering measuring the carbon footprint they fund. This type of metric ultimately enables to know the CO2 content of a euro (**Box 7**). Thus, although it cannot be pinpointed as transition risk measure because the link to the risk parameters is difficult to establish, this metric helps to compare the carbon intensity of the portfolio with its peers and therefore the need for portfolio adjustment. However, the weakness of this type of methodology lies in the lack of granularity (companies within the same sector can have very different carbon footprints while this information is available in national environmental accounts only at the sectoral level) and their static dimension. It is possible to assess the sensitivity of this carbon footprint at different carbon price levels and the contribution of each sector to this sensitivity, but the ability of counterparties to adapt is not considered.

Finally, the most advanced institutions are developing sectoral sensitivity analyses based in particular on an internal carbon price approach. The 2017 report, described several possible avenues for assessing the transition risk in portfolios. These included the "*shadow price*" methods which assess the impact of an introduction of a carbon price on cash flows (in particular on EBITDA variables) of a counterparty and thus to deduct the impact on credit risk. This approach may be augmented by a specific sectoral scenario associated with transition risk in order to include all the consequences on a particular sector of the materialisation of the latter (e.g. the evolution of the demand for this sector). Two institutions started this work, in particular in relation to the methodological framework developed by the UNEP-FI initiative. The first tests (on the most carbon-intensive sectors such as energy, transport and mining and metallurgical sector) did not show very significant impact. However, this methodology needs to be

Box 7

Example of a methodology to estimate a funded carbon footprint

The P9XCA methodology[17] developed by the Groupe Crédit Agricole in partnership with the Université Paris-Dauphine, aims at estimating an order of magnitude of a bank-wide funded carbon footprint by avoiding double counting.

Instead of guiding the choice between two companies or the sectoral allocation of a portfolio, it is developed to meet the needs of a lender. Emissions are allocated to economic agents with the levers of action to reduce them (as opposed to a more traditional "*scope*" assignment) according to "stake" accounting, which unites all economic agents in a value chain.

For example, all car-related emissions are allocated to the automotive industry (macro-sector transport). The advantage of this approach is to use official, public and free access databases (UNFCCC, OECD and BACH bases) and to enable a timely macro-economic mapping of the carbon footprint of all activities/sectors.

However, this methodology faces limited availability of data. For now, the time frame is based on the GHG emission data at sectoral levels that remain highly aggregated to provide an indication of the degree of exposure to transition risk. For example, in the national accounts for GHG emissions, the energy sector is considered as a whole without differentiation between different sources. Yet, there are significant differences in the carbon intensity between them (e.g. between nuclear and natural gas). With the P9XCA methodology, two banks with the same exposure amount to the French energy industry, but funding in one case nuclear energy and in the other energy from natural gas will have identical funded carbon footprints.

In addition to the availability of data, the P9XCA methodology is by nature static, i.e. it does not take into account the ability of companies to adapt. In particular, this is associated with the availability of data that does not allow for a specific assessment of differences in corporate strategies. For example, two car production enterprises may have very different adaptation capacities depending on their degree of anticipation of the energy transition. This would imply a significant future difference in the carbon footprint between these two enterprises and thus their respective capacity to bear the possible consequences.

17 ADEME, "Carrying out a balance sheet of greenhouse gas emissions", Sectoral Guide - 2014, financial sector.

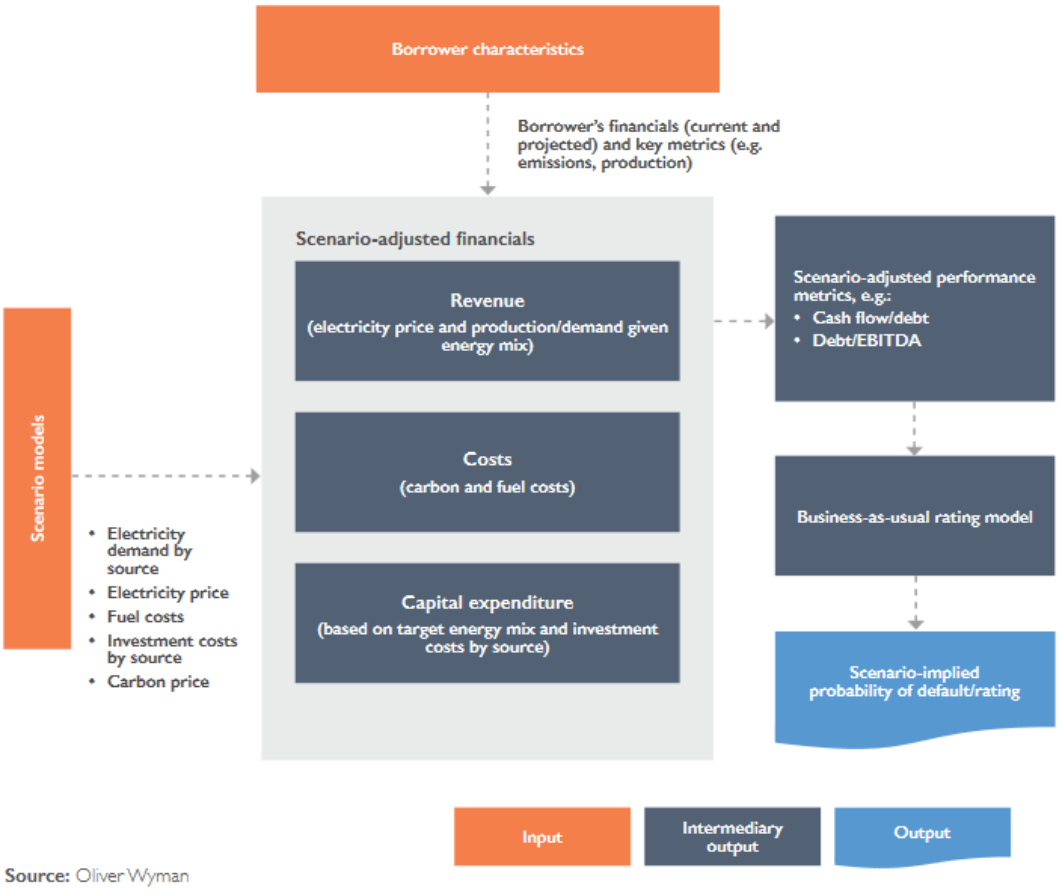
more thoroughly tested and refined. The main drawback of the framework developed by UNEP-FI is that it relies largely on expert judgement (**Box 8**).

Box 8

UNEP-FI methodology for assessing transition risk[18]

As with physical risk, UNEP-FI offers a structured approach for scenario-based assessment of transition risk. These scenarios provide plausible states of the world regarding the degree of transition risk for certain sectors (such as energy) considered a priori very vulnerable in the coming decades.

Summary schema of the UNEP-FI methodology



Source: Oliver Wyman

UNEP-FI offers a bottom-up approach, calibrated at the borrower level in order to overcome the lack of data to estimate individual credit risk for each. In the absence of data, the use of expert judgements is therefore very present in determining the ability of counterparties to adapt (e.g. their ability to pass on production costs related to carbon prices or to invest to "de-carbon" the production process). In practice, the proposed transition risk methodology is therefore a mix of modelling at the borrower level and sectoral modelling

18 UNEP-FI (2018): "Extending our Horizons: Assessing Credit Risk and Opportunity in a Changing Climate", April.

• **Methodological approaches need to be perfected to fully assess the transition risk.**

In some cases, approaches developed by institutions are still relatively distant from an adequate prudential approach. Some of them do not allow assessing the impact of a transition scenario on credit risk, except for the internal carbon price methods. It would therefore be necessary for institutions which did not embark on the latest methodological direction, to adapt their tools in order to measure the impact on credit risk at the portfolio level.

The transition risk linked to households is at best taken into account indirectly. To date, the development of tools has focused on firms (for example, existing methodologies for carbon footprint measures allocate emissions related to household behaviour to economic sectors), because the mechanisms for transmitting a transition scenario on the economic and financial health of the latter appear obvious. However, as households are heavily contributors to GHG emissions, particularly in France – around 28% – they could also be affected by higher carbon prices (directly or by consequence of higher carbon costs by the producer sectors) or sudden tightening of buildings' energy efficiency standards.

Institutions do not yet systematically collect the necessary data for assessing transition risk on their counterparties. As the challenges of carbon-related risks are recent, institutions do not systematically collect necessary information (energy mix of the production process, carbon footprint of activity) to assess the carbon footprint they fund and the vulnerability of their counterparties to transition risk. In those circumstances, publicly-available data used are not comprehensive enough. However, international work on transparency about the environmental footprint of firms (TCFD, proposed revision of the guidelines for the publication of non-financial information by the European Commission) may ultimately ease the collection of the necessary information.

2.3 Liability risk is generally not considered as relevant

A change in climate jurisprudence should lead to reassessment of liability risk. The 2017 report implicitly considered that the liability risk was less important with regard to the other two types of climate change-related risks, since cases against legal persons related to their contribution to climate change (or their insufficient actions to fight against global warming) were very limited. However, in recent years, there has been a significant increase in litigations against governments or firms.[19]

However, the liability risk could directly or indirectly impact banking institutions: i) directly, when the institution is deemed liable for the consequences of climate change and may be required to pay damages and / or fines (operational risk); ii) indirectly, as convicted companies which the banks finance may find themselves in financial troubles in the face of big fines or damage to pay, leading to an increase of their credit and market risk. Liability risk should not be confused with reputational risk that does not have implications for prudential risks in a strict sense, but in both cases the bank's reputation can be affected (being judged at least indirectly to the consequences of climate change).[20]

A first review of ongoing legal debates suggests that identifying a causal link between the local consequences of climate

19 Burge (M.), Grundlach (J.) (2017): "*The Status of Climate Change Litigation*", UNP Environment.

20 It should also be noted that an Australian bank (Commonwealth Bank of Australia) was sued by its shareholders, claiming that it had breached the 2001 Corporations Act with the publication of its 2016 Annual Report, which did not disclose the commercial risks associated with climate change. Prosecutions were discontinued following the publication of additional information by the bank. However, it is possible that in the future, in particular if national legislations are reinforced on the transparency about risks associated with climate change, institutions might be subject to prosecution for insufficient compliance with these requirements. However, the impact on prudential risks appears to be more distant.

change and the corporate action of a firm, and then of a bank, remains a considerable challenge. While the extent of the risk itself (direct or indirect) for banking institutions seems to be limited in the short to medium term, jurisprudence could rapidly evolve as courts increasingly accept to pronounce judgements regarding contributions to environmental degradation and climate change.[21] As such, an institution interviewed in the survey mentioned that the risk of indirect liability would be relevant for its business.

Liability risk could finally become, through legal accountability of governments, a catalyst for transition risk. In the case of the NGO Urgenta against the Netherlands, the State was judged on 24 June 2015 to be responsible for its deficiencies in climate actions. On the basis of policies initiated and promised by the government, the Netherlands will reduce their emissions by 17% in 2020 compared with 1990, while, the country's emissions needs to be reduced by 25% in order to comply with the IPCC recommendations. The District Court of The Hague based its judgement on a broad set of national and international texts.[22] The Court did not specify how the government should achieve this reduction in emissions but made several suggestions, including tax measures. Following this decision, litigations against governments have increased in recent years. This kind of legal outcomes could ultimately shorten the horizon for transition risk if is spreads more widely across countries.

21 White & Case (2018): "*Climate change litigation: a new class of action*", November.

22 Article 21 of the Dutch Constitution; EU emission reduction targets; principles established under the European Convention on Human Rights; the obligation not to prejudice established under international law; the theory of negligence; the principles of fairness, prudence and sustainability set out in the UNFCCC; and the principles of high levels of protection, prudence and prevention set out in European climate policy.

Some recommendations for better addressing climate change-related risks

Following the observations brought in this report about the implementation of the provisions of Article 173 of the ETGG Act by banking groups, several recommendations could be elaborated, for regulators and supervisors on the one hand, to banking institutions on the other hand.

1 Supervisors and regulators can play an important role in accelerating the work of institutions

• **Regulators must quickly agree on a robust, clear, detailed and consensual taxonomy of "green" and "brown" assets.**

Our interviews revealed that a difficulty faced by banks in defining their strategy, their reporting and their risk analysis is the absence of a robust, common, clear and detailed taxonomy for "green" and "brown" assets. Issues at stake are important with respect to the information provided to the public and investors while the risks that the absence of such taxonomy poses to competition and the possibility of *greenwashing* by less demanding jurisdictions. The ongoing work of the European Commission to elaborate such taxonomy of sustainable activities is therefore a very important first step, but it should lead to a consensus at international level. Discussions are also under way within the network of central banks and supervisors, the NGFS.

• **Supervisors must explicitly specify their supervisory strategy towards institutions with regard to climate change-related risks.**

The ACPR's action has been driven to date by the willingness to raise awareness among banking institutions in the context of implementation of Article 173 of the ETGG Act. In the current context where climate change-related risks are integrated as a new factor that could affect the traditional taxonomy of prudential risks, their monitoring can be part of the supervisory mandate of supervisors. It can define a supervisory approach and specify its strategy to strengthen the assimilation of the issues by institutions. For example, it could publicly communicate its approach to address climate change-related risks and how and when the different prudential pillars will be fed. It is also a matter for attention for the NGFS, to which the Banque de France and the ACPR are members.

• **The supervisor must strengthen its message by promoting the diffusion of best practices across institutions.**

Banks are progressing at an unequal pace and the orientations chosen to structure or develop tools can sometimes diverge. This is a normal consequence of the ETGG Act that encourages innovative approaches without being prescriptive. A way to better channel efforts is to indicate to banks the best practices that emerge and encourage banks to adopt them. Best practices could, for example, cover the relevant governance rules and the type of tools and metric to be developed within institutions to steer their alignment with a low carbon strategy.

• **The supervisor could facilitate the integration of climate change risks into published information requirements (Pillar 3).**

The development of dedicated supervisory reporting would help to increase the quantity and quality of published information on climate risks. This step, which is being carried out by the European Commission, depends on the adoption of a taxonomy following the above-mentioned features. The purpose of this reporting would be to foster transparency and market discipline (Pillar 3 requirements). This is complementary to the work of the TCFD or the provisions of the ETGG Act in France.

• **The supervisor could directly integrate climate risk into its dialogue with banking institutions.**

From a more prescriptive perspective, and similar to the Bank of England,[23] this approach should involve the supervisory teams of institutions and could feed into the qualitative aspects on which Pillar 2 capital requirements are based (**Box 9** for possible avenues in the case of banks supervised by the ECB).

• **Finally, it would be necessary to develop tools to reduce the identified risks whose nature is highly systemic.**

The development of stress test tools should ensure that capital requirements adequately reflect climate change-related risks. Some supervisors have already started conducting work to develop stress tests[24] relying on existing macroeconomic models to produce economic scenarios on the basis of a path of energy prices which would reflect an energy transition. These macroeconomic scenarios can then be used by supervisors (top down stress test) or institutions (bottom-up stress test) to estimate portfolio losses. Further work suggests sectoral modelling of the economy could be more adapted to assess the economic impact of a transition scenario. The DNB (De Nederlandsche Bank) has published research work[25] along these lines and similar work is under way at the ACPR and the Banque de France. The robustness of these early attempts to develop scenarios remains of course questionable, but over time this work could feed directly into the prudential requirements under Pillar 2.

Moreover, if the relative performance of "green" and "non-green" assets, as defined by a commonly agreed taxonomy, implied an intrinsic risk difference, the prudential framework could be adjusted. Different mechanisms are conceivable. The penalisation of unsustainable investments could be an example, with the possibility to opt for a Pillar 1 or Pillar 2 capital requirements.

23 Bank of England (2018): "Enhancing banks' and insurers' approaches to managing the financial risks from climate change", consultation paper, October.

24 De Nederlandsche Bank (2018): "*An energy transition risk stress test for the financial system of the Netherlands*", November.

25 De Nederlandsche Bank (2018): "*The price of transition an analysis of the economic implications of carbon taxing*", November.

Box 9

Possible options to integrate climate change risks into the SREP

Banking institutions supervised by the European Central Bank (ECB) are subject to an annual assessment exercise called the "SREP" for "Supervisory Review and Evaluation Process". It allows for the determination of Pillar 2 capital requirements. Several avenues for integrating climate change-related risks into this process can be considered.

In the short term: supervisors' assessment about the integrations climate change-related risks into the strategy and the risk framework of banks could be part of two items of the SREP:

- Element 1 "Business model" which assess both the viability and, in a forward-looking approach, the sustainability of the business model of the institution ("assessment of business model provisions and sustainability"). Nevertheless, the framework of this analysis should be adapted, as the current assessment horizon for the sustainability of the institution's business model is short (3 years).

- Item 2 "Internal Governance" which assess the quality of internal governance, the quality of the organisation of the institution, the monitoring of management bodies, the governance of the risk management function or the risk management framework (including parties dedicated to the RAF and the risk culture).

In the medium term: this assessment could be included in the SREP Element 3 – Block 1 for the analysis of exposure to credit, market and operational risks of institutions and the associated control framework with the objective to be integrated in the calculation of capital requirements.

2 Institutions could adopt best practices of the marketplace

- **Possible best practices to improve internal governance.**

Banks could clarify the organisation and the role of internal risk governance bodies, in particular management bodies. The allocation of responsibilities between the Risk Management Function and the CSR Function/Directorate (and internal governance for these functions through committees) could be clarified.

Steering the bank's strategic orientations should be explicit and implemented at the operational level. The strategic orientations for climate-related issues could be summarised by indicators, e.g. the funded carbon footprint, enabling senior management to assess progress at Group

level. The guidelines could then be specified at operational level (in particular the different business lines). This would include specific action plans and key performance indicators. In addition, institutions could also develop documentation at the Group level that highlights the impact of climate change on the institution's financial policy, business model and budget planning.

Climate-related issues could be explicitly integrated into the internal risk management framework. This would include: i) the integration within the risk appetite framework of metrics related to all associated risks (physical, transition and if possible liability) with thresholds and limits that ensure an escalation process within internal governance bodies in case of breach; ii) the development of indicators measuring the institution's exposure to climate change-related risks; iii) the implementation of reporting that consolidates the results of all actions that contribute to contain institutions' exposure to these risks; iv) finally, in the medium term, integrate climate-related risks into the internal framework of the three lines of defence.

- **Paths to develop or improve risk analysis tools.**

The first step would be to develop risk mapping that would serve as a basis for regular monitoring of credit exposures. Les Institutions could incorporate into their internal risk documentation an identification of the economic sectors (or activities) and geographical areas that are vulnerable to physical risk and transition risk. It would include a description of the mechanisms through which these sectors could be affected. On this basis, institutions could incorporate in dedicated reporting the monitoring of exposures in these identified segments. Geographical and sectoral granularity (or at the level of economic activities) should be appropriate to fully capture risk exposure. In addition, it is essential to ensure that the overall risk is covered. This means: for transition risk, exposures to households should also be considered; and for physical risk, potential development in insurance coverage should also be taken into account.

Institutions could make systematic the collection of the data needed to assess the climate change-related risks. In order to achieve a comprehensive mapping of risks, institutions could already implement the relevant data collection and develop the necessary tools to enable the calibration of their internal models. In particular, systematic collection of the precise geographical location of assets (production assets for corporate customers and main residence for retail customers) would be relevant for measuring physical risk. For transition risk, institutions could associate the building's energy rating with each funded real estate. Although collected, this information is not always used or exploitable due to the current organisation of the information systems. Finally, respondents could identify the data needed to measure a carbon footprint of counterparties or funded projects.

Institutions may move towards risk assessment methods that allow the linking of climate-related risk scenarios with the usual risk parameters. Banks could continue to develop their tools to analyse and model the impact of scenarios of transition and physical risks on usual risk metrics. Ultimately, the goal is to be able to calculate potential losses on portfolios. The focus may

first be on credit risk. Regarding transition risk, the internal carbon price methods developed by some institutions are promising. Although unsatisfactory at the moment, since relying almost exclusively on expert judgements, this work has the merit of proposing an approach that could be mobilised as part of climate stress tests. Static methodologies may be used in a complementary manner or be deepened to achieve the same result. As regards physical risk, the methods are at this stage even more uncertain for a medium-term horizon. In the meantime, banks could analyse, when climate events occur, if they did not cause abnormal losses on local portfolios. This could provide useful databases for the calibration of models or scenarios.

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Annex: Questionnaire on climate change-related risk management by French banks

Following the report "Assessing climate change risks in the banking sector" *https://www.tresor.economie.gouv.fr/Ressources/File/433386* and the discussions since then, the ACPR, in liaison with the Banque de France, prepared a questionnaire to assess the progress made by French banking groups in monitoring the climate change risk.[26] It will give rise to bilateral interviews organised by the ACPR banking supervisory directorates with banking groups from September 2018.

1 Global climate strategy in the bank

A Organisation and objectives

1 Could you present the evolution of your climate strategy since 2016? What are the topics (related to climate issues) that have been reviewed by the Board of Directors? Provide the main documents examined and extracts of the minutes of meetings. Specify the adaptation of the Climate Strategy within the different directorates concerned, if it has been formalised (e.g. action plans for 2017 according to business lines specifying objectives and metrics).

2 Has your institution developed a carbon neutrality strategy?

- If so, what are the assumptions, metrics, objectives and horizons?

- If not, what are the orientations of your strategy beyond commitments to 2020?

- What is your analysis of main risks and opportunities related to climate topics, impacting your business on this horizon?

3 The European Commission has published a legislative proposal for establishing a European taxonomy on sustainable economic activities. What changes could this taxonomy bring to your institution? What challenges would you face regarding this institutional innovation (e.g. impact on information systems)?

B Implementation of the LTE

4 Could you present the methodologies implemented by the insurance and asset management business of your group to comply with Article 173 paragraph 6 of the ETGG? Are they transposable to your banking activities? If so, what are the results? If not, why?

26 This work will help to provide input to the NGFS https://www.banque-france.fr/node/50628

C Financing commitments

5 What commitments have been announced or are being prepared by your group to exit from fossil energy financing? How much do they represent in relation to total exposures to the manufacturing sector or fossil fuel energy-intensive sectors? Detail the decision-making process in relation to these sectoral commitments. Who validates the associated documents?

6 Do green activities financing commitments rely on a study demonstrating the lower riskiness of these activities/assets?

7 What metrics have you developed to measure the achievement of your sectoral policies regarding climate aspects?

8 What are the measures taken in case of non-compliance with the objectives (reporting to dedicated committees/governance bodies, implementation of an action plan)?

2 Physical risk

A Identification of risks by sector

9 What are the already identified main mechanisms of transmission to your institution of economic shocks related to the materialisation of physical risk which affect your counterparties (by sector)? Provide a concrete example of transmission for each relevant sector for your group.

If no mechanism has been identified, what are your thoughts and analyses about this issue?

B Estimation of sectoral commitments exposed to physical risk

10 Using the attached template, update the exposure to sectors (NACE) which are most exposed to physical risk, following, to the extent possible the classification provided in terms of geographical allocation. By following the geographical division of the template, and if your internal expertise allows it, specify the degree of exposure/vulnerability of each geographical segment to climate change. Where appropriate, specify the indicators and metrics used to define this degree of exposure/vulnerability.

C Physical risk management tools and monitoring

11 Has your institution developed specific monitoring of its **exposure** to extreme weather events? If not, how is exposure to physical risk captured?

12 Facing international demands for aggregate indicators regarding climate change-related risks, especially with respect to physical risk and while continuing works on individual portfolios, do you agree on the following strategy based on 2 pillars:

- monitoring of top down indicators according to a common methodology to be defined (please indicate your preferences), in a first place;

- implementation of bottom-up indicators applied to specific sectors then.

13 What are the financial risks (market, credit, etc.) most sensitive to shocks related to the materialisation of physical risk?

14 What information is available to your institution's senior management when assessing these risks? Are they included in the overall risk assessment?

15 Has your institution developed an internal reporting to measure and monitor the effectiveness of the insurance coverage?

- What is your analysis of the expected evolution of the "insurance protection gap"[27] in the coming years? What would be the estimated impact on credit risk (in particular on mortgage loans, credit to SMEs)?

- Are you able to measure the impact on your activities of contagion of extreme weather events through the insurance sector?

- What are the actions implemented, or planned, to mitigate, transfer or control the risks associated with the "insurance protection gap" and contagion through the insurance sector of extreme weather events?

Provide any available internal analysis document.

16 Could you provide an estimate of the historical losses (credit, market and operational risk) of your group related to the materialisation of physical risk?

- Have tools been put in place/are being developed to enable this measure?

- What types of macroeconomic, financial, sectoral, or tax variables would be useful to measure these losses?

17 What economic or financial data would you need to carry out sensitivity studies on your exposures to physical risk? What would be the needed granularity of sectoral breakdown? Specify at least:

- the preferred sector (s);

- the shock variables: value added or profit before tax or gross operating surplus or other;

- your preference for a static balance sheet or a dynamic balance sheet;

- the desired time frame for the data;

- the preferred time horizon for these sensitivity studies.

D Response to physical risk

18 Have you developed extreme weather event scenarios? In your reply, please specify inter alia:

- the assumptions of occurrence and intensity;

- the period covered by the templates;

- the level of granularity of models (sector, geography, financial institutions, asset types);

- empirical data used in parameters;

- the mainly affected variables;

- mainly affected economic agents and institutions;

- decisions taken as a result of results for your strategy and risk management.

27 "*Insurance protection gap*" or "insurance deficit" is the difference between the amount of insurance coverage which is economically beneficial and what is actually insured. The protection deficit causes a severe lack of resilience in many developing and emerging countries, where insurance currently plays virtually no role in mitigating climate impacts.

19 Have you transposed these scenarios into stress tests according to the origin of risk (acute events such as floods, storms, droughts, or chronic events such as water rise) and geographical area?

20 What would be the solvency implications of these scenarios for your clients and then for your institution (in terms of prudential ratios)?

21 Do you envisage a sudden re-pricing of physical risk from markets? If so, what horizon? If not why?

3 Transition risk

A Identification of risks by sector

22 What are the main mechanisms for transmitting economic shocks to your institution related to the materialisation of transition risk affecting sectors that you consider most vulnerable and on which you have a significant exposure? In your reply, please specify inter alia:

- the source of risk (policy, regulatory change, technological innovation, market, energy source, others);
- the level of granularity of the analysis (characteristics of counterparty[28]/sector/geographical area);
- the transmission of risk to the financial system;
- the impact horizon;
- opportunities for adaptation (resilience factors);
- the intensity of the default risks.

28 For example: Credit quality, remaining life of the contract.

B Estimation of sectoral commitments exposed to transition risk

23 Update exposure of major sectors (or subsectors) of business (NACE) funded by your institution, or counterparties of your institution, from the attached template, following, to the extent possible the classification provided in terms of geographical allocation, for the "transition risks" tab, Table 3, the total exposure to the carbon-intensive sectors and the low carbon sector (green assets). Indicate the taxonomy used or explain how these two asset classes are identified.

C Management tools and monitoring of transition risk

24 Has your institution developed monitoring of **the exposure to its largest clients exposed** to the transition risk?

25 Facing the international demands for aggregate indicators of the risks to climate change, especially as regards transition risk, while continuing to work on individual portfolios, do you agree on a strategy based on 2 pillars:

- top down monitoring indicators according to a common methodology to be defined (please indicate your preferences), in a first place;
- implementation of bottom-up indicators applied to specific sectors then.

26 What are the financial risks (market, credit, etc.) most sensitive to shocks related to transition scenarios?

27 Have you estimated the carbon footprint of your funding? If not, what are the obstacles to do so?

28 What is the information available to your institution's senior management when assessing these risks? Are they included in the overall risk assessment?

29 Is the transition risk taken into account in assessing the risk profiles of your counterparties (in particular for those of the **fossil-fuel energy** sectors for which financing and advisory activities are maintained)?

- If so, specify the methodology and sources used.[29]

- If not, specify the reasons.

30 What types of macroeconomic, financial, sectoral, or tax variables would you need to model this risk?

31 What economic or financial data would you need to carry out sensitivity studies on your exposure to fossil-fuel energy sectors or any other sector exposed to transition risks? What would be the necessary granularity of sectoral breakdown? Specify:

- the preferred sector (s);

- the shock variables: value added or profit before tax or gross operating surplus or other;

- your preference for a static balance sheet or a dynamic balance sheet;

- the desired time frame for the data;

- the preferred time horizon for these sensitivity studies;

- your expectations in terms of policy-related information (regulation, tax, etc.).

D Response to transition risk

32 Have you developed climate stress tests and/or resilience action plans based on temperature increases and transition risk scenarios?

- How are these results reflected in risk management?

- If not, how will you integrate the use of transition scenarios into your risk management?

Specify the time horizons.

33 What stress test scenarios are most relevant for transition risk? Specify by sector.

- Establishment of a carbon price.

- Increased volatility in the value of market parameters.

- Emergence of new technology.

- Or any other scenario related to question 19.

34 What would be the solvency implications for your clients and then for your institution (in terms of prudential ratios), of these scenarios?

29 If you note the carbon footprint of your funding, specify the scopes (1, 2 or 3) considered and all parameters related to the rating of the counterparty.

35 Do you envisage a sudden re-pricing of the transition risk leading to a reallocation of assets across different types of funding, especially for non-green funding?

• If so, what would be the time horizon? To what extent would you be exposed? Which strategy would you consider in response?

4 Liability and reputational risk

36 Has your institution been sued with respect to environmental- or climate-related issues? If so, what were the consequences?

37 Within your overall risk analysis approach, have you identified liability/ reputational risks related to environmental or climate-related issues?

Provide an analysis of these risks, if formalised.

38 What are your practices with your counterparties to assess their involvement in climate change?

39 Have you decided to play a leading role in the development of sustainable financial tools and services?

• If so, how do you plan to diffuse your best practices?

• If not, what are, according to your institution and within your activities, the barriers to sustainability.