ING

Climate risk report 2020

Our approach to climate risk management

do your thing

Contents

Updated on 12 October 2020

Foreword

Climate change is one of the biggest threats our world is facing. Its effects are potentially devastating to people's lives and the economy. As our planet heats up, we can expect to see more frequent and severe weather events such as hurricanes, floods and heatwaves causing untold damage and financial loss. There is a growing sense of urgency to take action to limit these events. To achieve the goal of the Paris Agreement to keep global warming to well-below two-degrees by the mid-century, everyone has to play a part.

Steven van Rijswijk, CEO of ING

This includes ING. As a bank, the biggest impact we can make is with our lending portfolio. We are steering our loan book to finance activities that are aligned with achieving the goals of the Paris Agreement. This includes exiting coal used for power production by 2025. Because what we finance is important when it comes to helping the transition to a low-carbon society.

At the same time, ING is increasingly aware of the risks associated with climate change. We see climate change risk as both a strategic opportunity and a financial risk. To get an understanding of our exposure to climate risk and the impact on our business we are focussing our analysis on those sectors likely to be most severely affected by climate change and advancing our work on the identification of climate risk.

All relevant risks should be considered in our risk management framework and integrated into a forward-looking approach. We are evolving our approach as we develop a better understanding of climate risk. We have risk identification and assessment processes in place, helping us to adjust our risk appetite and policies, and have set up a governance structure around climate risk that we will follow when implementing our business strategies. In addition, we have started setting climate-related metrics and targets for certain sectors.

Our approach to the management of climate change risk continues to develop and ING still has some way to go in refining our methodologies and how they incorporate climate risk. We are continuing to advance our understanding and approach to climate risk so that we are prepared for what is to come and can make informed decisions, engage with our clients on this topic and seize the opportunities derived from climate change.

1 Introduction

- Understanding climate risk
- About this report
- Scope

1 Introduction

Climate change and the risks associated with it can impact ING's future risk profile. Rising average temperatures and the need to transition towards a low-carbon economy will drive assessments of the impact of climate change on banks. This report provides an overview of our current actions regarding climate risk management.

Understanding climate risk

At the UN COP21 climate change conference in 2015, governments came together to urge action to limit the rising temperature of our planet. This became known as the Paris Agreement. The consequences for climate risk management are twofold. First, if there is no meaningful progress in lowering emissions in the years ahead, there is an increased likelihood of abrupt policy interventions as governments attempt to meet the goals of the Paris Agreement. This would speed up the changes that are necessary within society and in companies in order to transition to a low-carbon economy. However, it could also result in stranded assets, marked by the loss of value of assets that are no longer part of a more sustainable world. Second, if there is no progress made and the policy interventions are not made, the consequences of global warming will become increasingly devastating.

As such, climate change risk (we refer to this as climate risk) includes physical and transition risks. **Physical risks** arise from the physical effects of climate change on businesses' operations, workforce, markets, infrastructure, raw materials and assets. Physical risks emanating from climate change can be event-driven (acute) such as increased severity of extreme weather events (e.g. cyclones, droughts, floods, and fires). They can also relate to longer term (i.e. chronic) shifts in precipitation and temperature and increased variability in weather patterns (e.g. sea level rise).

Transition risks result from the policy, legal, technology and market changes occurring in the shift to a lower-carbon global economy. Transition risk also incorporates 'stranded asset risk' – write-downs of carbon-intensive assets that could quickly become unusable or reduced in value. Transition risks include policy constraints on emissions, imposition of carbon tax, water restrictions, land-use restrictions or incentives, market demand and supply shifts, and reputational considerations.

The transition to a low-carbon economy comes with risks and opportunities. As such, climate change is an integral part of ING's agenda. This is evidenced by our enhanced policy framework for Environmental & Social Risk (ESR), sustainable finance activities and our Terra approach. In recent years, banks also started evaluating the potentially negative impacts of climate change on their business. This new push for disclosure is triggered as climate risk becomes increasingly more credit-relevant. Transition risk as well as the physical damage caused, could have an impact on the economy. To minimize the impact, efforts to limit greenhouse gas emissions and the rise in global average temperatures have been stepped up. However, even with these measures, physical risks could continue to rise.

Figure 1 Climate risks to financial risks

Source: Adapted from NGFS Climate Scenarios for central banks and supervisors, June 2020

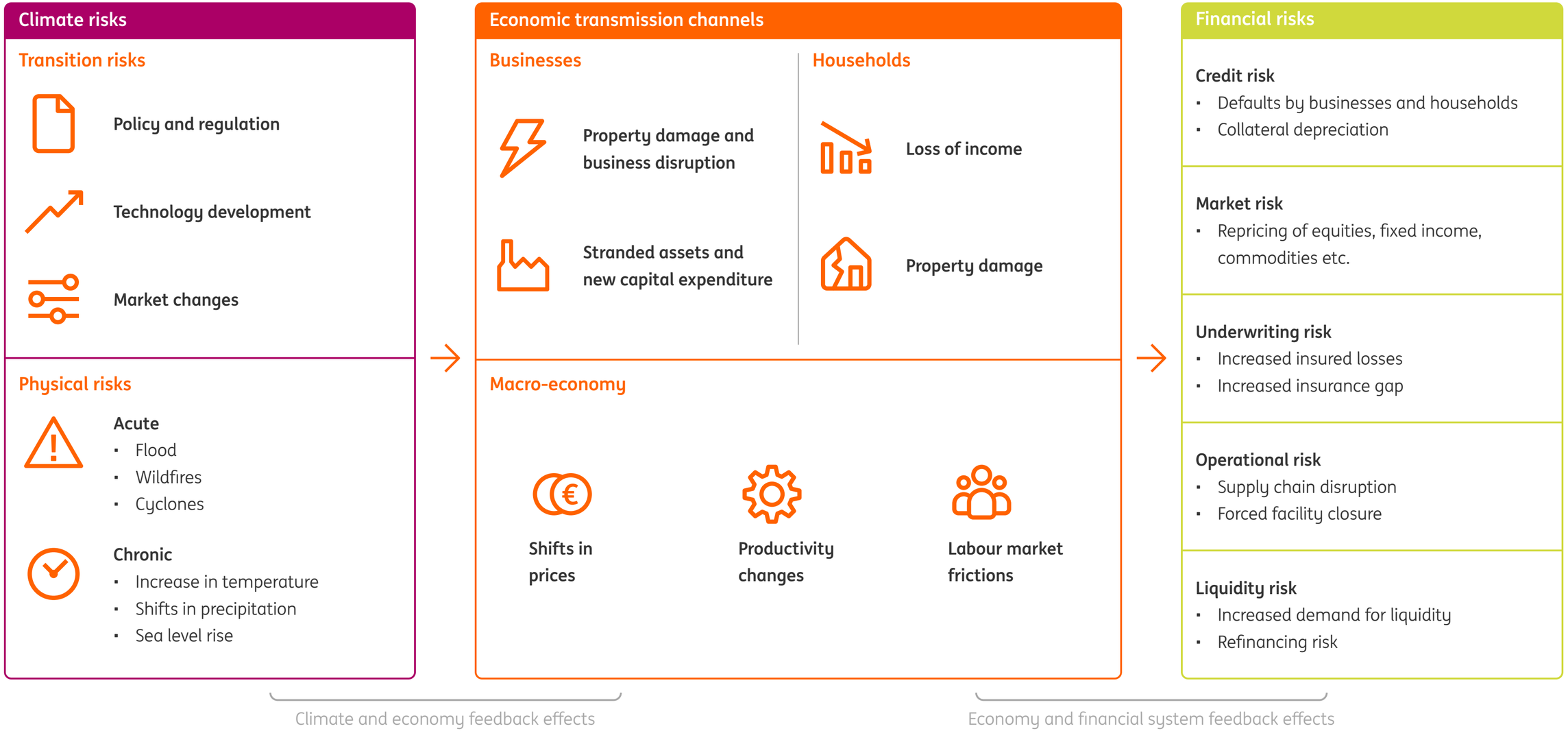


Figure 1 shows how climate risks, in the form of physical and transition risks, can affect households, businesses as well as the macro-economy as a whole. As such, the rise in average temperatures affects all of us. On the one hand, transition risks can lead to stranded assets as well as the need for firms to increase investments to make the transition. On the other hand, physical risks can lead to the damage of property or even business disruption. The long-term shifts in climate patterns, through increase in overall temperatures, shifts in precipitation, rising sea levels, could impact labour markets and productivity levels. For instance, affecting where agriculture is feasible but also where we can earn our livelihoods as a society.

From a macro-economic perspective, an example is the introduction of carbon pricing by governments to address climate change. This raises the cost of production for energy-intensive companies, which has a negative impact on GDP. On the other hand, it incentivises green investment and raises money for the government that can be ploughed back into the economy. If done wisely, carbon pricing can have a positive impact on GDP and unemployment.

The potential impacts that physical and transition risks could have on households, businesses and the macro-economy ultimately require us to view climate risks as a risk that has an impact on various financial risks (as described in Figure 1). These feedback effects call for the need to translate climate into financial risk models that assess for instance credit, market, liquidity and operational risks.

As such, we believe it is important to consider climate as part of our risk management processes. In developing this approach, we have been guided by the various regulatory expectations and recommendations. For example, the ECB's Guide outlines expectations for banks on considering climate-related and environmental risks, as drivers of financial risk. We have also sought to exchange good practices with our peers through industry working groups (see 'Governance'). Because the issues are dynamic with increasing regulatory requirements, collaboration and the sharing of insights is important to achieve standardization in our approaches towards climate risk management and reporting.

The next phase in our approach to climate risk will be to consider the measurement and severity of the risks identified. This is a developing area of investigation and the complexity of this analysis is highlighted by the wide range of possible future climate pathways and their economic impacts. This differs across sectors, geographies and financial products (think of different impacts for mortgages versus loans to businesses). The assessment requires input from credit risk and sector experts, risk modelling teams and research teams to consider the relevant scenarios. This informs our longer term strategic choices and the potential financial impacts.

About this report

Since 2017, we have captured our progress on climate risks and opportunities according to the recommendations of the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) in our Annual Report. An overview of how these initiatives are linked to the TCFD recommendations can be found in the appendix of this report. Next to our Annual Report disclosure, with this report we aim to share more in-depth insights into our current practices related to climate risk management. This includes our approach as well as a number of examples of our analysis of physical and transition risk.

The report focuses on the implications of climate change for ING. While the impact of climate change on society will also be significant, we do not address this in detail here. In addition, the report does not aim to provide any advice. Its purpose is to inform clients, peers and other interested stakeholders about the analysis that we have undertaken concerning climate risk. ING aims to report on our progress in managing climate risk on an annual basis.

Climate alignment vs climate risk management

While the TCFD recommendations capture both the opportunities and risks related to climate change, this report focuses on the risks. Our approach to climate alignment, what we call the Terra approach, is captured in more depth in the standalone Terra progress report 2020.

It is important to distinguish between climate change alignment commitments and climate risk management objectives. With the Terra approach, ING commits to align our portfolio with the goals of the Paris Agreement to keep global warming to well-below two-degrees. This addresses the question: What is the impact of my business on climate change?

In our approach towards climate risk, ING seeks to manage the risks affecting our clients and our portfolio. This addresses the question: What is the impact of climate change on ING's business? These questions are two sides of the same coin, with clearly common ground between the two.

Scope

The effects of climate change are wide-ranging and could impact almost everything we do. In line with our Terra approach, we decided to set a primary focus on our lending portfolio when assessing climate risks. This includes Retail Banking and Wholesale Banking.

While we aim to assess all sectors on their exposure to climate risk, in the case of transition risk our initial focus is on the greenhouse gas emissions-intensive sectors, and in the case of physical risk, on our real estate portfolios (residential and commercial). Following a sector-based approach allows us to investigate an individual sector's vulnerability to climate change.

When translating the impact of climate change into financial risks, we often refer to credit risk. While we do focus on the impact on credit, we also investigate the impact on other risk types.

2 Governance

- Climate Change Committee
- Risk committees
- Climate risk working group

2 Governance

Climate risk is currently governed by ING's Climate Change Committee and relevant risk management committees. In 2020, we formed a climate risk working group to further develop suitable methodologies and support its integration in risk management processes.

Climate Change Committee

In 2018, ING formed the Climate Change Committee (CCC) to secure board-level oversight of strategic climate-related risk and opportunity management. The CCC is chaired by ING's chief risk officer (CRO), who is also a member of the Management Board Banking, and co-chaired by the board member responsible for Wholesale Banking. It is further comprised of a number of board members, including the CFO, and senior managers from the Wholesale and Retail business. The CCC is advised by an internal Climate Expert Group (CEG) made up of experts from various front office, sustainability, risk and other departments. The CCC meets six times per year and follows an agenda prepared by the CEG, which meets monthly. Climate risk is a fixed agenda item in all CEG and CCC meetings.

More specifically, the CCC is responsible for:

- Mandating appropriate processes by which ING identifies and manages climate-related financial risks and opportunities
- Guiding policies, strategy, performance objectives and monitoring pertaining to climate-related financial risks and opportunities
- Monitoring and overseeing progress against relevant goals and targets.
- Guiding external communication and transparency requirements.

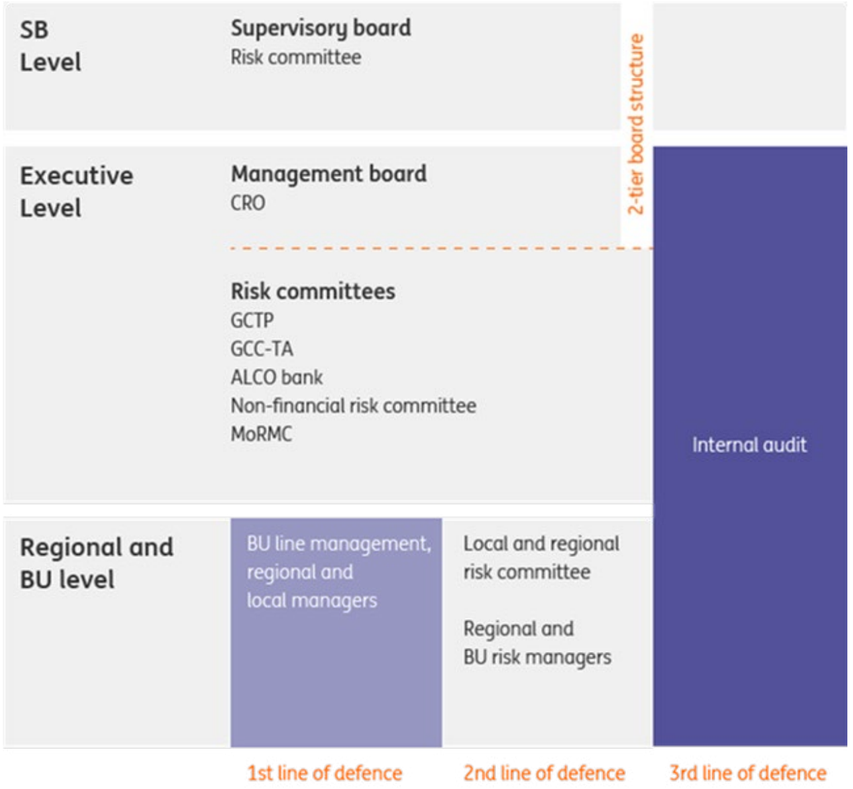
Risk committees

Effective risk management requires company-wide risk governance. ING's risk and control structure is based on the 'three lines of defence' governance model, whereby each line has a specific role and defined responsibilities and the execution and control of tasks are separated. At the same time, the three lines have to work closely together to identify, assess and mitigate risks. This governance framework is designed to manage risk in line with ING's overall risk appetite as approved by the Management Board Banking, Executive Board and Supervisory Board.

For example, the primary responsibility for the application of the ESR Framework lies with Front Office (FO) which includes relationship managers and deal principals. They act as the first line of defence, identifying environmental (including climate) and social risks in the transactions. The FO must evidence compliance with the applicable ESR sector policies and credit risk managers act as a second line of defence to verify compliance of a transaction with the ESR Framework.

From a credit risk perspective, climate change is being discussed within the Global Credit & Trading Policy Committee (GCTP) and the Global Credit Committee – Transaction Approval (GCC-TA). Both the GCTP and GCC-TA risk committees include ING's CRO, CFO and Head of Wholesale Banking.

Figure 2 Risk governance



Source: ING Group Annual Report 2019, page 164

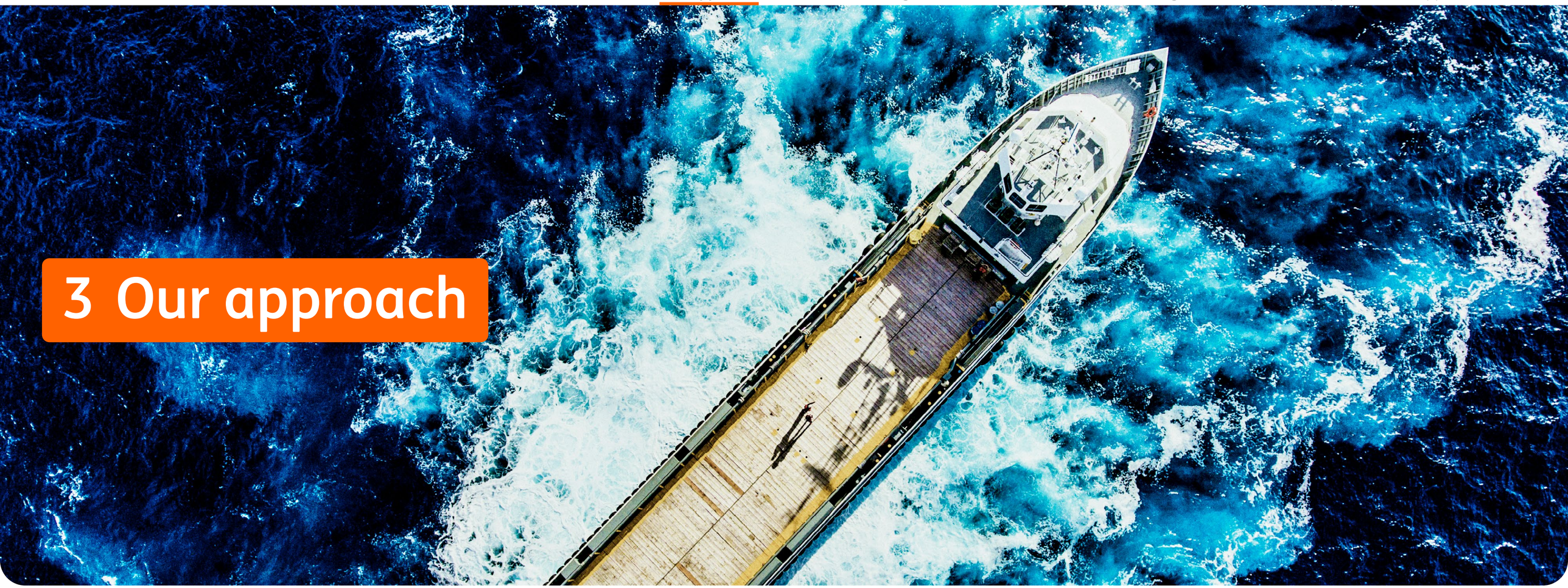
Climate risk working group

In addition to the CEG, in 2020 we established an internal climate risk working group. It is made up of colleagues from Wholesale Banking, Sustainability and Risk, as well as expertise on scenario development and stress testing. The purpose of the working group is to further strengthen our capabilities on climate risk and speed up the integration of climate considerations into our risk management processes. Relevant findings of the working group are shared monthly with the CEG and bi-monthly with the CCC.

Milestones of the internal working group so far include:

- Outlining ING's approach to integrate climate within our processes;
- Developing initial transition risk heatmap;
- Pilot to measure the impact of flooding risk on mortgages in collaboration with an insurance company; and
- Publication of this Climate Risk Report.

Working group members participate in various industry initiatives. We joined Phase 2 of the UNEP FI Pilot Project on Implementing the TCFD Recommendations for banks (see 'Sector Insights'). We also participate in the Dutch central bank (DNB) working group on climate risk. This year's key output was a joint report on 'Climate risk and the financial sector: sharing of good practices', which featured a compilation of case studies from members. We also actively participate in the Dutch Banking Association (NVB) expert pool on climate-related and environmental risks and ING is an active member of the Energy Efficiency Financial Institutions Group (EEFIG) working on risk assessment.



3 Our approach

- Scenario analysis
- Stress testing our portfolio
- Transition risk heatmap

3 Our approach

We aim to incorporate climate risk within our risk management framework. To further identify climate risk within the lending portfolio, we have used various techniques including heatmapping, scenario analysis and stress testing. This has sharpened our understanding of the potential impact of climate risk.

As a **first** step, we were guided by our endorsement of the FSB's TCFD recommendations stretching across robust governance, strategy, risk management, metrics and targets related to climate change. We have set our climate risk management ambition based on other relevant materials, such as the ECB's recent Guide on Climate-related and Environmental risks. This includes integrating climate change as part of our risk appetite framework.

The **second** step was to undertake an internal gap analysis to identify divergence from the outlined recommendations on climate risk. We leveraged internal platforms such as our CEG to map how existing ING climate-related programmes provide coverage of some of these recommendations:

- We have risk policies such as our ESR policy framework that limits the negative impact on climate, environment and our own portfolio.
- We have climate-related programmes, such as the Terra approach through which we measure and steer our lending portfolio towards the Paris Agreement's goal of well-below two-degrees.
- We have opportunity management initiatives, for instance through financing renewable energy projects, energy-efficient buildings and climate mitigation and adaptation projects.

In the **third** step we have outlined our roadmap, including deliverables and timelines. The plan outlines the relevant departments required for its execution. The high-level plan was presented to and approved by the CCC. As a result, we formed our internal working group on climate risk to actively engage with climate risk identification, assessment, control and monitoring (see 'Governance').

The **fourth** step is execution. To identify risks, we use activities such as heatmapping, scenario analysis and stress testing. In addition to high-level assessments on a portfolio level, we undertake sector-specific assessments (see 'Sector insights') as well as analysis at the transaction and counterparty level. The combination of this layered approach helps to identify different levels of risk to inform sector strategies and risk appetite.

This is an iterative and ongoing process, which allows us to keep developing our climate risk capabilities and continuously improve its integration into our policies, procedures, strategy and systems. Internally, we provide updates on our progress via our board-level committees (see 'Governance') and externally we report our progress on an annual basis.

The following section elaborates on the fourth step, execution.

Scenario analysis

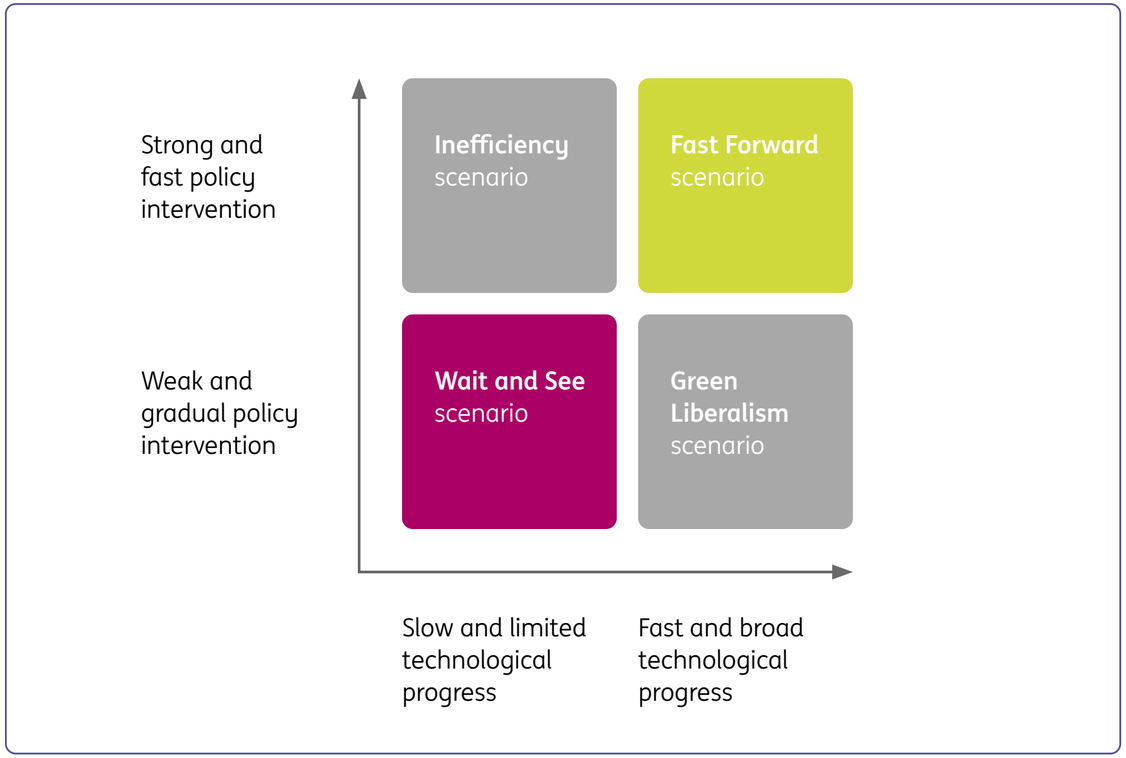
The traditional risk management techniques used by banks and financial institutions are not well suited to assessing climate risks. The most obvious problem is that climate risks range from short to long term, playing out over decades, which is longer than the usual business horizons. Longer term forecasts are notoriously less accurate than short-term forecasts. But in the case of climate risks the problems are more profound, since the acronym VUCA, which stands for volatility, uncertainty, complexity and ambiguity, can be applied to them specifically. Given that many of the risks are unprecedented, historic data is of limited use, and the complex and non-linear effects of risks makes modelling, let alone forecasting, especially challenging. A way of addressing this is to employ scenario analysis, which relies on plausible narratives to explore a range of possible outcomes.

In 2017, ING's Economics department started developing in-house energy transition scenarios from policy and technology drivers as these are decisive factors that shape the future of climate change. These scenarios were designed to explore future pathways to 2040 of fossil fuel demand and related CO_2 emissions from energy-intensive sectors such as manufacturing, transportation, real estate and the power sector. Four scenarios were devised, based on fast or slow changes in policy and technology. We called these scenarios: 'Fast Forward', 'Wait and See', 'Green Liberalism' and 'Inefficiency'. The scenarios are described in more detail in our publication 'Break it or make it'.

This scenario planning exercise helped us to better understand the drivers of the energy transition, the transition risk in energy-intensive sectors as well as the potential speed of the energy transition. For our assessments so far, we have focussed on the two extreme scenario cases. The 'Fast Forward' scenario combines technological progress with strong policy intervention to reach the Paris goals. Our 'Wait and See' scenario lacks rapid development on both fronts. Both scenarios set the boundaries for the wide range of possible future outcomes for fossil fuel demand.

Figure 3 Four scenarios to explore the energy transition

Energy transition scenarios based on technology and policy trends



Source: ING Research 'Break it or Make it'

There is a need to develop short-term climate scenarios

Long-term scenarios help us to understand the range and scale of the climate challenge. However, in order to translate this into financial risks and business decision-making, it is essential that we also develop short-term to medium-term scenarios looking no more than five years ahead. Since accumulated greenhouse emissions will keep rising, climate risk is likely to only increase, such scenarios will be shaped less by the climate itself and more by the action taken by governments, business and consumers. In this regard, the smooth representative pathways of long-term climate models have little to offer in analysing the growing short-term to medium-term risks of extreme weather events or disorderly transitions.

Also, price volatility is critical to the economic and financial impacts of scenarios. In particular, the risk of asset price collapses, which essentially reflect sudden changes in long-term expectations, can effectively turn long-term problems into immediate problems for banks and financial institutions. The energy price crash that accompanied the Covid-19 pandemic has dramatically illustrated the scale of the stranded assets risks that climate change poses.

ING is developing a broader application of scenario analysis to better understand the impact of climate change as well as to meet the growing list of requirements from regulators. The ECB's Guide on Climate-related and Environmental Risks emphasises that institutions need to embed climate and environmental risks across the whole range of their business decisions from overall strategy to operations. This means assessing not just long-term risks, which it defines as beyond a five-year horizon, but short-term and medium-term risks, too. It also expects this to be done across geographies, sectors and products.

The multiple applications of climate scenarios for banks

Scenarios can serve the following functions:

- Bank strategy and business model (market positioning, bank resilience);
- Stress testing (3-5 year adverse scenarios vs baseline);
- Regulatory requirements (capital at risk, liquidity);
- Risk appetite and commercial strategy (heatmap, sector strategy including exposure limits, pricing);
- Risk management (credit, market, liquidity, operational, reputational, liability) and;
- Thought leadership (external communication, client advisory).

Source: ING

Stress testing our portfolio

To assess the effect of climate change on the bank's financial position, in 2019 ING carried out an internal climate risk stress test. As there is no standard for climate change stress testing yet, ING has adapted its regular stress testing models while leveraging on insights from supervisory climate stress tests and internal climate (risk) experts.

We made the assumption that ING will be confronted with both transition and physical risk. Using the 2018 DNB transition risk stress test as a starting point, we added our own elements, such as the physical risk of flooding. Whereas for transition risk we assessed the impact on a global scale, for physical risk we restricted the scope of the stress test to the Dutch mortgage portfolio only. ING's stress test models were used to assess the severity of the four scenarios (see 'scenario analysis'), in which we developed stress test overlays for the more long-term transition risk and the above-mentioned flooding event. For example, the additional physical risk is based on the flooding areas 'Kromme Rijn' and 'Rivierenland', as identified in the DNB's Waterproof? report.

The stress test showed that climate risk is material and could have a significant impact. It also confirmed the potential impact on asset classes that are deemed particularly vulnerable, such as residential and commercial real estate (in regions sensitive to flooding), oil & gas-related industry and the automotive and shipping sectors.

We strive to undertake further climate change stress tests that incorporate and adopt the yet to be defined industry standards. ING will also aim to further enhance data gathering to better assess exposures that are vulnerable to physical risk.

Transition risk heatmap

In 2020, we investigated the effect of transition risk across sectors in the form of a heatmap. The aim is to anticipate how sectors are responding to steering to a low-carbon economy under a specific climate scenario as well as the identification of potential hotspots.

Based on our engagement with the UNEP FI Pilot Project on Implementing the TCFD Recommendations for banks, industry-specific research and expert judgement to assess sectors affected by transition risk, we arrived at a grouping of the sectors in the three categories of high, medium and low risk.

This initial assessment builds on the 'Fast Forward' scenario, which is closest to a two-degree scenario, in which we evaluated the different impact of four risk factors: direct emission costs, indirect emission costs, low carbon capital expenditure and revenues. Evaluating these risk factors was part of the UNEP FI Pilot Project methodology.

The outcome of the early stage heatmapping exercise, using a 'Fast Forward' scenario that anticipates a rapid transition to a low-carbon economy, showed that our transition risk exposure can be mapped as follows:

High risk

- Coal
- Oil and gas
- Shipping and aviation
- Construction (includes cement)
- Freight transport
- Livestock
- Aluminium production

Medium risk

- Agriculture (includes fishing and crops)
- Automotive
- Electronics
- Retail stores (includes warehouses)
- Metal mining
- Iron and steel production

Low risk

- Real estate
- Telecommunication carriers
- Rail systems
- Renewable power generation
- Natural gas extraction
- Financial institutions

Source: ING

Alternative scenarios will provide different potential outcomes but the insights gained from this initial assessment will form the basis for further analysis into our exposure to carbon-intensive industry sectors as we continue to refine our methodologies. The outcome of the exercise can also inform sectors included in future stress tests. Ideally, we will move towards a more quantitative heatmapping approach, allowing for a better comparison across sectors. In the next chapter, we describe some sector-specific insights.

4 Sector insights

- Physical risk
- Transition risk
- UNEP FI Pilot Project on Implementing the TCFD Recommendations for Banks

4 Sector insights

Physical risk

In 2020, we conducted various analyses on the implications arising from physical hazards in our lending portfolio. In the following section, we present two of the pilots we conducted this year: one on ING's global mortgage portfolio and another on the Dutch commercial real estate portfolio.

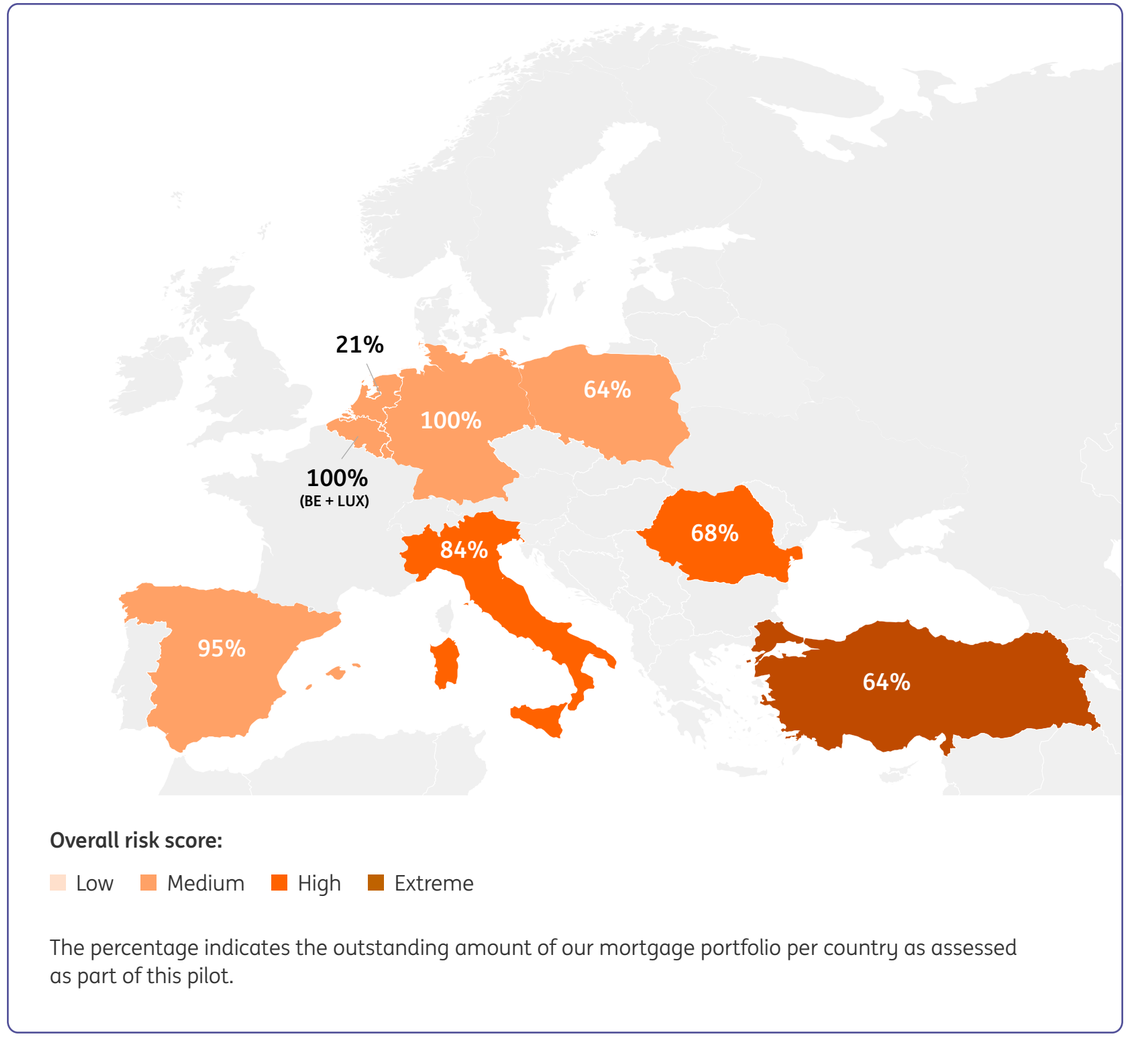
Pilot on residential real estate

As physical assets can be directly affected by the changing climate patterns, we initiated a pilot to identify the impact on our mortgage portfolio. The pilot assessed the potential impact of climate hazards on 30,000 European post codes, including post codes from our largest mortgage portfolios in the Netherlands, Germany and Belgium. As some post codes represent several addresses, the pilot represents 60% in outstanding of our global mortgage portfolio. We used the data from reinsurer Munich Re to devise present-day and forward-looking hazard assessments. Risk scores were provided on an overall level as well as for each assessed hazard, based on four categories (ranking from low to extreme).

Table 1 Climate hazards included in the pilot

Type of score	Type of climate hazard
Present-day score	Tropical cyclone; Extratropical Storm; Hail; Tornado; Lightning; Wildfire; River Flood; Flash Flood; Storm Surge
Forward-looking scores	Flood Fluvial Zones; Water Stress Index

Figure 4 Pilot countries including risk score for climate hazards



Source: ING

The forward-looking analysis is based on the representative concentration pathways (RCP) developed by the Intergovernmental Panel on Climate Change (IPCC). We selected the RCP 8.5 pathway, mapping to approximately a 4-degree scenario, on a 2050 time horizon. Of the climate hazards assessed, the most risk was associated with flooding. It was more prominent in Western European countries (such as the Netherlands, Belgium, and Germany), where there is a noticeable difference in severity of flooding if we compare the present day to 2050. The assessment of precipitation showed the climate hazard increasing over time, where warmer countries (such as Italy, Spain, and Romania) experience a relatively higher increase in rainfall in comparison to countries with a mild climate.

The pilot provided us with relevant insights into the extent of physical risk already present in our portfolio today and how this might evolve in the future. The analysis showed that most properties will be impacted by climate change but the extent of the impact will vary. We are keen to assess these risks further and understanding their respective financial implications for ING. As such, we aim to continue to develop our approach and expand our assessment. For example, moving from assessing physical risk at a post code level to individual property level, to have a more accurate assessment of the risk.

Pilot on commercial real estate

To better understand the physical effects of climate change on ING's commercial real estate portfolio, we initially focussed on the Netherlands. We conducted a pilot using the data from a local provider, BlueLabel, assessing approximately 7,600 post codes for the impact of drought, heat stress, flooding risk from dyke breaches and flooding due to heavy rainfall. Due to duplication of postcodes as well as apartments being in the same buildings, this pilot represents a coverage of approximately €11 billion. Each address was given a score out of five categories (ranking from very low to extreme).

Leveraging the assessment on historic data, the outcome shows that the impact of physical risk is as follows:

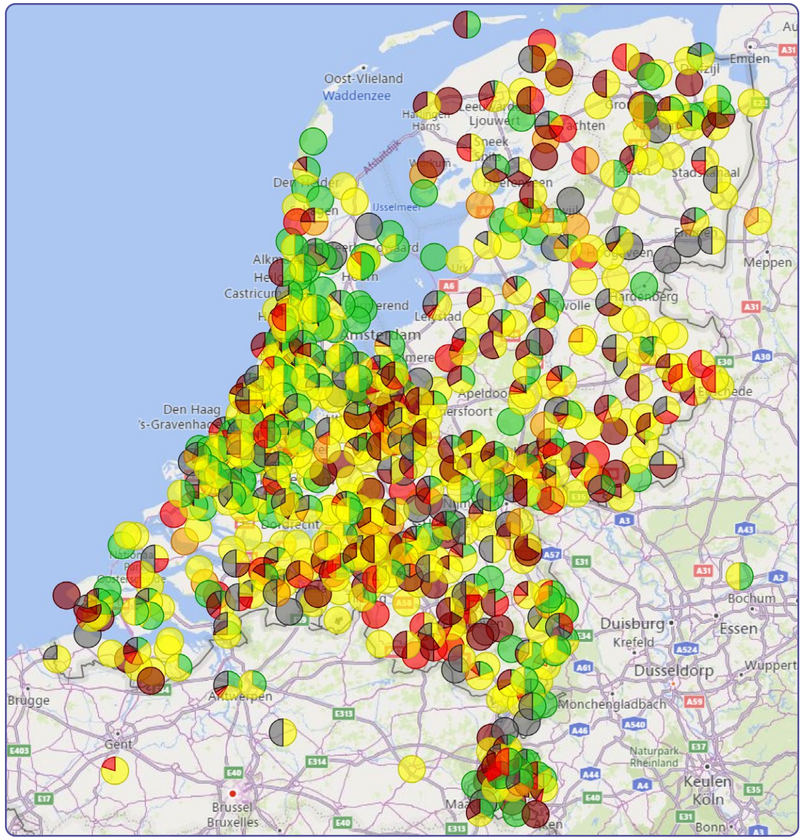
- **Heavy rainfall:** is assessed based on the water level relative to the doorstep. Addresses were evaluated on whether they would experience a 1 in 100 year event of heavy rainfall. The outcome was that for most addresses the water level would stay below 5 cm, which can be handled by the drainage system.
- **Heat stress:** is an indication of the air temperature experienced around the building. This can be impacted by the materials used. Findings showed that the number of tropical days (above 30 degrees) per year is increasing steadily (currently 4.7 days per year) and that many of the addresses suffer from 'feels like' temperatures of above 42 degrees.
- **Drought:** causes low levels of groundwater that can result in damaging a building's foundations in the long-term. The risk associate with this hazard is medium, as groundwater remains on average at 2-4 metres of the assessed addresses.
- **Flooding:** the height of a flood caused from a dyke breach. Within the Netherlands this risk was assessed to be low (average height 20-50 cm), mainly due to the dyke protections already implemented.

This pilot is an initial step in the assessment of physical risk in our commercial real estate portfolio. By piloting various methodologies and tools, we can assess the impact climate change has on the buildings we finance and help to decide on appropriate mitigation strategies. In the coming years, we are aiming to translate the impacts into financial ratios and include a forward-looking analysis.

Figure 5 Heavy rainfall

- A: No water
- B: < 5 cm
- C: 5 - 10 cm
- D: 10 - 23 cm
- E: > 23 cm
- No output available

The difference between maximum water depth and threshold height (assuming a heavy shower of 93 mm / 70 min)

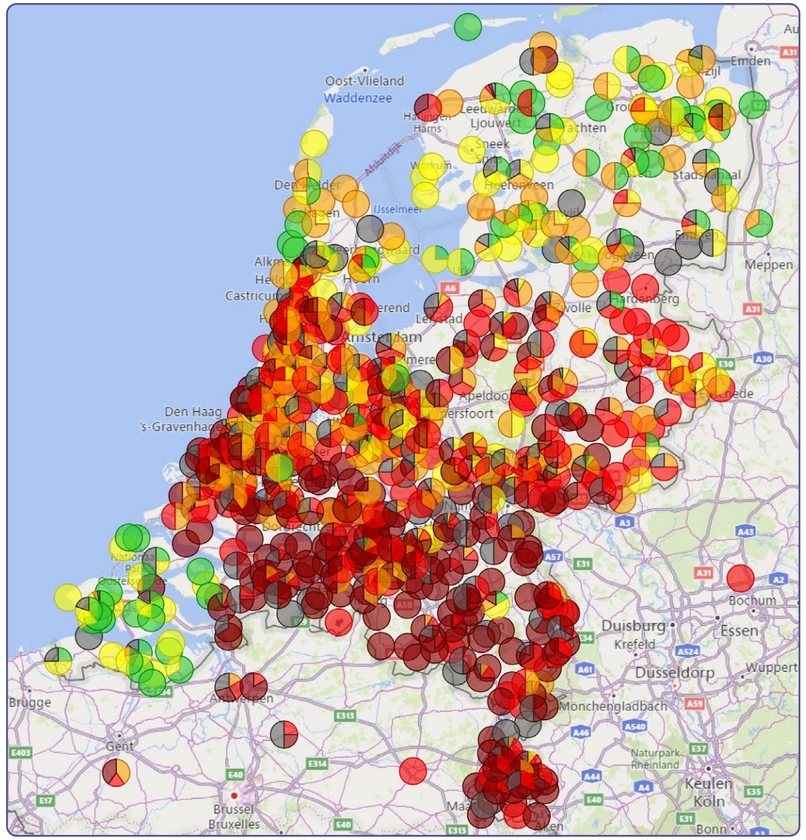


Source: ING

Figure 6 Heat stress

- A: < 38°
- B: 38° - 40°
- C: 40° - 42°
- D: 42° - 44°
- E: > 44°
- No output available

The perceived temperature around the building on a very hot summer day (reference date 1 July 2015)

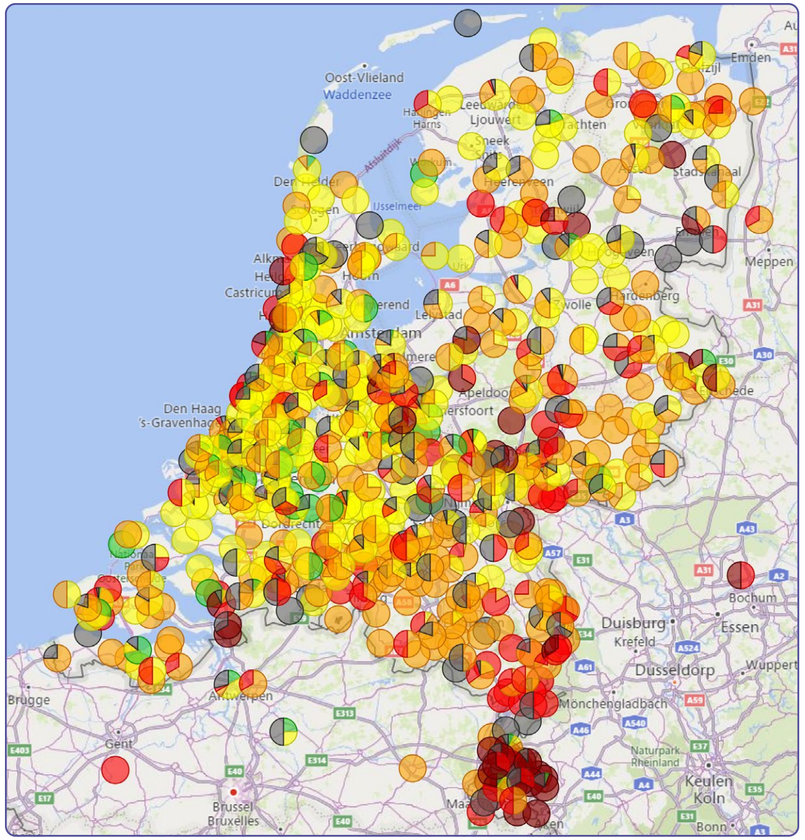


Source: ING

Figure 7 Drought

- A: < 1 m
- B: 1 - 2 m
- C: 2 - 4 m
- D: 4 - 8 m
- E: > 8 m
- No output available

The deepest groundwater level in the summer around the building

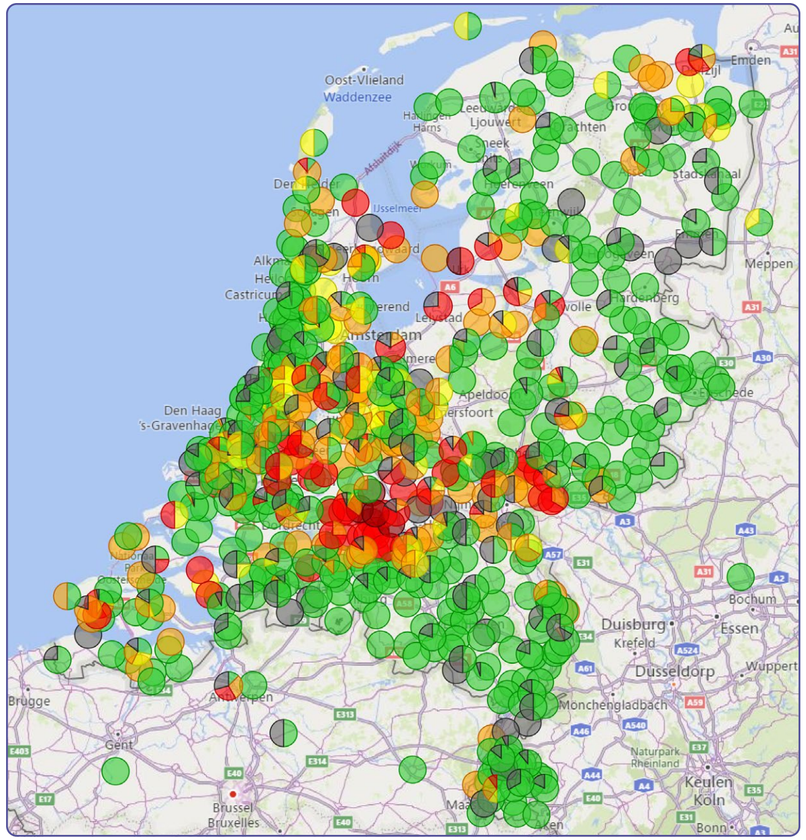


Source: ING

Figure 8 Flooding

- A: < 20 cm
- B: 20 - 50 cm
- C: 50 - 200 cm
- D: 200 - 500 cm
- E: > 500 cm
- No output available

The height of the water around the building as a result of a dike breach (based on maps of the EU Floods Directive)



Source: ING

Transition risk

In assessing transition risk our initial focus is on greenhouse gas emissions-intensive sectors. This also builds on the transition risk heatmap (see 'Our Approach'). In this section we zoom in on two of our sectors. On the one hand, we provide an overview of our journey in the energy sector that has been evaluating transition risk in its portfolio for a number of years. On the other hand, residential mortgages represent a large part of our loan book and as such we will provide an initial view of the impact transition risk could have here.

Our journey in the energy sector

ING has a long history of supporting clients in the energy sector across a range of activities, including conventional and renewable power generation, as well as the fossil fuels value chain. With regards to the energy transition, we carefully monitor sector-specific developments linked to the move towards a low-carbon economy. For example, as the generation of fossil fuels is a big contributor to global greenhouse gas emissions a transition from high-carbon to low-carbon and renewable energy production can be anticipated.

The Paris Agreement in 2015 triggered a review of climate risks for our energy sector loan portfolio and for the businesses of our clients. In 2016, we reviewed our oil and gas finance activities for climate risk and initiated ING's Energy Transition Scenario Planning (ETSP) project. This was supported by the Economics department that developed the scenarios (see 'Our Approach').

In the recent publication 'Break it or make it', we zoom in on the global energy transition and specifically in the light of the recent pandemic. Scenarios assess the potential effect on future fossil fuel demand, specifically for energy intensive sectors. This includes the power sector, transportation, manufacturing and real estate as the largest users of fossil fuel. However, each sector is different and will have a different response to making the transition to a low-carbon based economy. This also very much depends on the available alternatives. For example, in the automotive sector we can already see the shift towards electric vehicles that will continue to replace more and more conventional cars.

As an outcome, during 2017 and 2018, ING's lending businesses involved in financing emissions-intensive industries were challenged with the outcome of the 'Fast Forward' scenario, the most extreme energy transition scenario (with policy and technology as the drivers). The response plan for the energy sector included changes to lending policies, such as on coal; portfolio reference limits (by volume and term of loan) for high transition risk businesses; an investment in more reliable and extensive data and business intelligence; and the appointment of a member of the global sector management team who is solely focussed on energy transition planning.

In 2019, ING joined the UNEP FI Pilot Project on Implementing the TCFD Recommendations for Banks, where ING specialists participated in sector working groups, including the oil & gas group. This experience has given us further qualitative and quantitative insights into the potential impacts of climate risk on our current lending portfolio and future business.

Lastly, our Terra approach aims to align our lending portfolio with the Paris Agreement which includes setting targets on a sector-level. For fossil fuels a range of metrics and approaches was reviewed, including indicators such as portfolio financing, energy mix, and emissions intensity. While many of these require further data maturity and better models for robust application, ING committed to reduce its financing to the upstream oil & gas sector by 19% by 2040 against 2019 levels. A more climate aligned portfolio could be one that faces lower transition risks, however it is not inherently climate risk free.

The insights we have gained on climate risk over the past five years, from our own internal work and collaboration with others, and the greater awareness we now have of the opportunities for climate action in the energy sector, have laid a solid foundation for ING's contribution to the energy transition goals of the UN Sustainable Development Goals and the Paris Agreement as well as safeguarding our commercial business.

A view of the residential real estate portfolio

Our high-level internal heatmapping exercise indicates a relatively low transition risk associated with ING's residential real estate portfolio. However, as a large part of our loan book consists of residential real estate, we aim to specify the impact of transition risk.

To understand how transition risk could occur for this sector we apply the same four climate risk scenarios, as described in the 'Our approach' chapter. What would happen if 'strong and fast policy intervention' was implemented? Considering that the energy efficiency of buildings (including residential housing) is currently measured by energy labels, we could foresee policy moving towards favoring, or even excluding, certain energy labels. In this case, customer preference could shift towards the 'better' energy labels (or at least energy labels in line with the policy). Increased demand for these labels could in turn push up the property price. While at the same time there is a risk that properties with lower energy labels will decrease in price and value.
For example, national governments have already outlined plans to further limit the impact that the real estate sector has on global greenhouse gas emissions. As such, the Netherlands has outlined regional energy strategies (RES) and Germany has defined a Long Term Renovation Strategy (LTRS). Both examples ultimately aim at making buildings more energy efficient. If these changes are going to be reflected in energy labels, it could be seen as a promising step to reduce the vulnerability of the sector towards transition risk.

Another transition risk that could occur is the rate of technology adaptation. What if a particular technology, e.g. smart temperature control, can only be applied in certain types of buildings? It could be that houses in which this new technology cannot be used will drop in value. It is hard to predict the type of properties that would be most affected. For example, to replace traditional fossil fuel based heating systems with electrified ones (e.g. heat pump), proper insulation is required. If a house is not insulated, it could easily add up to €50,000 to the installation costs (depending on the level of insulation and measures already taken). Therefore there is a higher risk of poorly insulated houses (which goes hand in hand with poor energy labels) losing their value as demand drops among buyers who want to live 'gas-free'.

The impact of a decrease in value is most apparent at the moment of sale. If a property is sold at less than the loan-to-value (LTV), there is a risk that the home owner is stuck with a gap between the sales price and the loan value and is unable to repay the loan

provider the full amount outstanding. Secondly, as the LTV is an important factor for determining the level of risk in our portfolio, a change in the LTV could lead ING to make a restatement on the composition of our portfolio.

However, quantifying this relationship remains challenging. For instance, the Bank of England detailed in its working paper that there are signs that the energy efficiency of a building could predict credit-riskiness. The final report from the EU initiative on Energy efficient Data Protocol and Portal (EeDaPP) revealed similar findings. To further investigate the quantitative relationship, we participate in the Energy Efficiency Financial Institutions Group (EEFIG) working group on risk assessment.

As the examples show, energy labels are a common way of qualitatively or quantitatively describing the transition risk for residential real estate. It is therefore important to note that the current availability and accuracy of energy label information is limited. Energy labels are not publicly disclosed in all countries. Where they are disclosed, we have noticed they are often inaccurate. As transition risk becomes apparent and the need to quantify this in our portfolio grows, the greater the need for correct data will become.

UNEP FI Pilot Project on Implementing the TCFD Recommendations for Banks

In deepening our commitment to the FSB's TCFD recommendations, ING is working with the United Nations Environment Programme Finance Initiative (UNEP FI) on a pilot to help banks implement the TCFD recommendations. The pilot was started in 2018 and 39 banks are involved in Phase 2 (2019-2020) of the programme.

Management consulting firm Oliver Wyman coordinates the UNEP FI programme and engages relevant stakeholders such as the Potsdam Institute for Climate Impact Research (PIK), International Institute for Applied System Analysis (IIASA), climate research institute CICERO and climate resilience consultancy Acclimatise.

As a participant, ING is pioneering and further developing transition and physical risk assessment models and metrics to enable scenario-based, forward-looking assessment and disclosure of climate-related risks and opportunities. The relevance of physical and transition risks, the two risk components, is assessed in UNEP FI sector working groups. ING joined the real estate, agriculture and oil & gas working groups.

For instance, as part of the agriculture working group, the impacts of transition risk on various segments of agriculture are investigated. The agriculture and land use sector has long been identified as a major contributor to greenhouse gas emissions but due to the lack of data and climate scenarios specifically tailored to this sector, alternative approaches need to be developed. This represents an initial starting point of our assessment of the impact of climate change on our agriculture portfolio.

To capture the insights of Phase 2, several reports are published. These include outcomes of the sector working groups as well as case studies of individual banks on both physical and transition risk. In addition, the stand-alone report 'From Disclosure to Action' focuses on the application of the TCFD recommendations within financial institutions.

Through the working groups, ING was able to exchange good practises with other participants as well as to further develop approaches to identify climate risk. This engagement amongst peers could support potential standard setting within the financial industry. As approaches are still developing and specifically the quantification of risks remains challenging, the exchange amongst peers will keep playing an important role.

5 Climate metrics and targets

5 Climate metrics and targets

Metrics and targets assist the appropriate management of the risks and opportunities associated with climate change. The TCFD recommendations describe this as an interplay between climate risks and opportunities, whereby one can guide the other. Overall, metrics on climate change are still in development. This chapter describes some of our initial efforts on metrics and targets set around climate change.

We measure the impact of our own operations via ING's environmental footprint, because we believe that change starts with us. We are transitioning towards being a more resource-efficient and climate-resilient company by measuring, setting targets and monitoring our activities. For instance, how much business travel we undertake and how much electricity our buildings use.

ING has the opportunity to achieve greater impact through our clients. So far, under our Terra approach we have defined sector-level climate metrics and targets such as technology change and emissions-intensity reduction to align our lending portfolio with the Paris Agreement. The approach focuses on the most climate-relevant sectors as measured by their global carbon footprint (i.e. those sectors responsible for approximately 75% of total global emissions). To do so, we apply multiple technologies, with the two primary ones being the PACTA approach for corporate lending and the Science Based Targets Initiative's Sectoral Decarbonisation Approach (SBTi SDA). The table below gives an overview of our 'Terra Toolbox' of methodologies and the metrics used to set targets for each sector.

Table 2 Terra toolbox of methodologies

Sector	Measurement Methodologies	Target-setting Methodologies	Metrics used
Power generation	PACTA [1]	PACTA	kg CO_2e/MWh
Fossil fuels (oil, gas and coal)	2DII / Katowice Banks	2DII / Katowice Banks	Reduction in € financed (upstream oil and gas; coal)
Commercial real estate (NL)	Delta Plan	Paris-proof method	kg CO_2/m²
Residential real estate (NL/DE)	PCAF [2]	SBTi SDA	kg CO_2/m²
Cement	PACTA	SBTi SDA	t CO_2/tonne cement
Steel	PACTA	SBTi SDA	kg CO_2/tonne steel
Automotive	PACTA	PACTA	kg CO_2/km
Aviation	PACTA	SBTi SDA [3]	g CO_2/passenger km
Shipping	Poseidon Principles (UMAS – FUSE)	Poseidon Principles	kg CO_2/tonne nautical mile

Source: ING Terra progress report 2020

1 PACTA: Paris Agreement Capital Transition Assessment methodology of the 2° Investing Initiative, technology-based, utilising asset-level data and forward looking capital expenditure plans of clients (where possible).
2 PCAF: Platform Carbon Accounting Financials – carbon accounting framework which prescribes the use of building energy labels (EPC) as a proxy for CO_2 or energy consumption data for residential real estate.
3 SBTi/SDA: Science Based Targets initiative's Sectoral Decarbonization Approach – sets out sector decarbonisation pathways designed so as to be in line with IEA (ETP) B2DS scenario using intensity metrics.

To achieve our targets, we combine several approaches. We engage directly with clients in climate-relevant sectors to support them in transitioning to less greenhouse gas intensive technologies. On top of that when it comes to making financing decisions, climate-related restrictions in ING's ESR policy limit our exposure in certain sectors, including a reduced appetite for unconventional fossil fuels (arctic offshore oil and gas, tar sands, shale gas). For project finance we also apply the International Finance Corporation's performance standards and the Equator Principles, including a climate change risk assessment.

With regards to the energy transition, we carefully monitor sector-specific developments linked to the move towards a low-carbon economy. For upstream oil and gas, our credit assessments include a strong focus on production costs. By focusing on low-cost production, we work with our clients to ensure their businesses are resilient to the risk of 'stranded assets'.

We are also working on developing appropriate metrics and targets for climate risk. As a member of the UNEP FI Pilot Project on Implementing the TCFD Recommendations for Banks, we worked in sector working groups to develop methodologies that allow translating the impact of climate change on, for instance, the effect on probability of defaults. This is an initial attempt to quantify climate risk. However, methodologies still need further refinement in order to draw substantial conclusions of their impacts. We strive to further develop sector-specific methodologies for the identification and assessment of the risks on hand as well as suitable translations into the potential financial risks.

Lastly, we want to future proof our clients' and our own business by empowering clients to accelerate their transition to sustainability. We do this by offering sustainable finance products, such as sustainability linked loans, green and social bonds and sustainable investments. We continue to help set standards and innovate in the market, for example by launching the world's first sustainability linked loan with Royal Philips as the sole sustainability coordinator in 2017, or being the first bank to embed sustainable transition into fund finance with Quadria Capital. A dedicated team within the ING Wholesale Banking serves as the global centre of expertise on sustainable finance, providing expert advice, transaction structuring and driving sustainable business opportunities for ING globally. The team works with all business lines to guide ING's lending portfolio to align with the well-below two-degree goal of the Paris Agreement and achieve year-on-year progress on our climate ambitions.

6 Next steps

6 Next steps

Our ambition is to embed climate within our risk appetite framework and consider it throughout our business processes. However, identifying the impact of climate change on the bank is an ongoing development. We strive to build on our learnings so far and keep refining our approach to managing climate risk moving forward.

This report provides an overview of the latest information on ING's climate risk management. We see climate change risk as both a strategic opportunity and a financial risk. As such, we want to be prepared for what is to come. The years ahead will determine the climate change pathway for society and businesses, which will ultimately affect the level of climate risk to which we are all exposed.

Addressing climate risk leads to better informed strategic decision-making in risk management and a greater awareness of related business opportunities. The topic requires a bank-wide approach that addresses not only climate change, but also considers a range of environmental risks, such as biodiversity loss or water stress.

We recognise the challenge of developing methodologies to translate climate change into financial risks. Defining the impact of climate change on specific assets remains challenging. This is often due to the lack of available data, including sector-specific and forward-looking data. An additional issue is working with conflicting time horizons.

While climate change poses long-term challenges, shorter term scenarios are needed to assess risks and inform stress tests that display the impact on risk ratios. We will strive to overcome these challenges and take them into account as learnings, when we are further outlining our approach to climate risk.

In the coming years, we aim to strengthen our capabilities, refine methodologies, expand the scope of our risk assessments and ultimately embed climate risk in our financial risk processes. Further updates on our progress on climate risk management, including the implementation of the TCFD recommendations, will be available in our integrated Annual Report.

With that, we hope this report provided an insightful overview of ING's current actions regarding the management of climate change and its related risks.

7 Appendix

Recommendations of the Taskforce for Climate-related Financial Disclosures

The Financial Stability Board published its TCFD recommendations in 2017, which focus on making climate-related disclosure more transparent. The following table provides reference to ING's progress on implementing the 11 TCFD recommended disclosures covered as part of this report.

TCFD Recommended Disclosure			Chapters where addressed
Governance	a	Describe the **board's oversight** of climate-related risks and opportunities.	Governance
	b	Describe **management's role** in assessing and managing climate-related risks and opportunities.	Governance
Strategy	a	Describe the climate-related **risks and opportunities** the organization has identified over the short, medium, and long term.	Our approach, Sector insights
	b	Describe the **impact** of climate related risks and opportunities on the organization's businesses, strategy, and financial planning.	Our approach, Sector insights
	c	Describe the **resilience of the organization's strategy**, taking into consideration different climate-related scenarios, including a two-degree or lower scenario.	Our approach, Sector insights
Risk Management	a	Describe the organization's **processes for identifying and assessing climate-related risks**.	Our approach, Sector insights
	b	Describe the organization's **processes for managing climate-related risks**.	Our approach, Sector insights
	c	Describe how processes for identifying, assessing, and managing **climate-related risks are integrated** into the organization's overall risk management	Our approach, Sector insights
Metrics & Targets	a	Disclose the **metrics** used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	Climate metrics and targets
	b	Disclose **Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG)** emissions, and the related risks.	Climate metrics and targets
	c	Describe the **targets** used by the organization to manage climate-related risks and opportunities and performance against targets.	Climate metrics and targets

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Certain of the statements contained herein are not historical facts, including, without limitation, certain statements made of future expectations and other forward-looking statements that are based on management's current views and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in such statements. Actual results, performance or events may differ materially from those in such statements due to a number of factors, including, without limitation:

(1) changes in general economic conditions, in particular economic conditions in ING's core markets, including changes affecting currency exchange rates,
(2) the effects of the COVID-19 pandemic and related response measures, including lockdowns and travel restrictions, on economic conditions in countries in which ING operates, on ING's business and operations and on ING's employees, customers and counterparties,
(3) changes affecting interest rate levels,
(4) any default of a major market participant and related market disruption,
(5) changes in performance of financial markets, including in Europe and developing markets,
(6) changes in the fiscal position and the future economic performance of the United States, including potential consequences of a downgrade of the sovereign credit rating of the US government,
(7) consequences of the United Kingdom's withdrawal from the European Union,
(8) changes in or discontinuation of 'benchmark' indices,
(9) inflation and deflation in our principal markets,
(10) changes in conditions in the credit and capital markets generally, including changes in borrower and counterparty creditworthiness,
(11) failures of banks falling under the scope of state compensation schemes,
(12) non-compliance with or changes in laws and regulations, including those financial services and tax laws, and the interpretation and application thereof,
(13) geopolitical risks, political instabilities and policies and actions of governmental and regulatory authorities,
(14) ING's ability to meet minimum capital and other prudential regulatory requirements,
(15) outcome of current and future litigation, enforcement proceedings, investigations or other regulatory actions, including claims by customers,
(16) operational risks, such as system disruptions or failures, breaches of security, cyber-attacks, human error, changes in operational practices or inadequate controls including in respect of third parties with which we do business,
(17) risks and challenges related to cybercrime including the effects of cyber-attacks and changes in legislation and regulation related to cybersecurity and data privacy,
(18) changes in general competitive factors,
(19) the inability to protect our intellectual property and infringement claims by third parties,
(20) changes in credit ratings,
(21) business, operational, regulatory, reputation and other risks and challenges in connection with climate change,
(22) inability to attract and retain key personnel,
(23) future liabilities under defined benefit retirement plans,
(24) failure to manage business risks, including in connection with use of models, use of derivatives, or maintaining appropriate policies and guidelines,
(25) changes in capital and credit markets, including interbank funding, as well as customer deposits, which provide the liquidity and capital required to fund our operations,
(26) the other risks and uncertainties detailed in the most recent annual report of ING Groep N.V. (including the Risk Factors contained therein) and ING's more recent disclosures, including press releases, which are available on www.ING.com.

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