



Assessing and Managing Climate Risk Exposure

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Note

The NAFIN Visiting Fellow programme is hosted by the Latin America and Caribbean Centre (LACC), the Grantham Research Institute on Climate Change and the Environment (GRI) at the LSE. The programme supports one fellow each year to ‘address the challenges to international climate finance flows from the perspective of the national development bank’. The views expressed in this Working Paper do not reflect the position of the LSE, the LACC, NAFIN or the GRI.

Assessing and managing climate risk exposure:

How can NAFIN incorporate into its structure and decision-making processes the governance mechanisms proposed by the Task Force on Climate-related Financial Disclosures (TCFD) to attract international investors concerned about climate change issues?

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1. INTRODUCTION

An essential role of Nacional Financiera's (NAFIN) Treasury Division is to ensure the availability of funds so that the bank can transfer competitive rates and terms to micro, small and medium-sized enterprises (MSME's) and other strategic investment projects in Mexico. In order to ensure this role is fulfilled NAFIN aims to diversify its source of funds and specifically to attract finance from international investors. It does so in the context of international investors increasingly taking into account climate change-related issues in their decision-making processes. This decision-making is informed by guidelines for climate risk disclosure set out by the Task Force on Climate-related Financial Disclosures (TCFD) that was set up in December 2015. The TCFD followed a series of meetings between financial sector representatives in 2016 and 2017 concluded with agreement on the need for a standardised framework of climate risk disclosure; an initiative spearheaded by the Governor of the Bank of England.¹ In consequence, companies around the world are being asked to improve transparency and to disclose information on how they manage exposure to climate risks according to the TCFD recommendations (TCFD, 2017).²

In order for NAFIN to continue to attract international investors who are concerned about climate change issues, it needs to explore how to comply with the TCFD recommendations through assessing climate risk of its loan portfolio and improve governance mechanisms to incorporate policies into its lending processes to mitigate these risks. Hence, the purpose of this Working Paper is to investigate NAFIN's loan portfolio exposure to climate risk and provide suggestions of mechanisms to manage this risk. In Section 2, I identify the economic sectors where NAFIN has provided funds through a quantitative analysis of the loan portfolio. I also examine the carbon intensity and climate change legal framework of Mexico to recognise the risks that NAFIN is facing in its present asset portfolio. Finally, in Section 3, I rate the bank according to its current climate risk management quality. Then, I suggest ways in which NAFIN can manage climate risk both in terms of transparently disclosing risk to international investors, and to then implement principles, policies, and processes to assess and manage these risks. For this purpose, I also draw from the analysis of policies and carbon pricing exercises outlined in previous Working Papers of the NAFIN Fellowship Programme.³

1.1 Climate change policy context

Economists describe climate change as a negative externality because the pollution impacts and costs from greenhouse gas emissions (GHG emissions) affects society's welfare. In this view, climate change results from a market failure because producers of GHG emissions do not have an incentive to reduce those emissions (Bowen et al. 2014). In order to reduce GHG emissions and manage the unavoidable future effects of climate change, policy-makers are exploring a range of mitigation and adaptation strategies (Adger et al. 2018). In recognition of the increasing social and economic impacts of climate change, it is widely accepted that companies that pollute should pay for the damage caused to people's health and the environment (Grantham Research Institute, 2018). An economic tool that follows the "polluter pays" principle and aims to encourage companies to reduce their emissions is the establishment of a carbon price that recognises carbon costs, obliging a

¹ The Task Force held eight plenary meetings before the launch of the Final Report. Meetings were celebrated in London, Singapore, Washington, New York, Paris, Berlin and Rome through 2016 and early 2017. Source: <https://www.fsb-tcf.org/events-landing/>

² Companies that have complied with the TCFD recommendations include BP, Equinor, Shell and Total.

³ Available at: <http://www.lse.ac.uk/lacc/publications/PDFs/Cesar-Espinosa-Garcia-WP2-GR.pdf> and <http://www.lse.ac.uk/lacc/publications/PDFs/LSE-NAFIN-working-paper-1-Perez-Montero-dev-banks-green-finance.pdf>

decision between controlling GHG emissions, through fostering investments in low-carbon technologies, decreasing production or paying additional costs. There are two instruments used to define a carbon price: the carbon tax and the cap-and-trade systems. The carbon tax is a price instrument that the government sets per tonne of greenhouse gas emitted. The cap-and-trade system is a quantity instrument that aims to put a limit on the level of emissions through the distribution of a finite number of tradable permits among firms.

At the 21st Conference of the Parties of the United Nations Framework Convention on Climate Change (COP 21) celebrated in Paris in December 2015, representatives agreed to undertake efforts to address the threat of climate change. They committed to “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” (UNFCCC, 2015, page 3). To achieve these goals, the Parties pledged Nationally Determined Contributions (NDCs). Mexico, for example, pledged to reduce GHG emissions 30% by the year 2020 and 50% by 2050 compared with year 2000 emissions (Grantham Research Institute, 2018). The Mexican Government targeted specific reductions by sector: 18% in transport, 31% electricity generation, 18% buildings, 14% oil and gas, 5% industry, 8% agriculture, 28% waste and 144% forestry (Climate Action Tracker).

In order to achieve the NDCs, governments have started to design climate change policies to encourage firms to reduce their GHG emissions by increasing taxes on fossil fuels or reducing subsidies on electric consumption (International Energy Agency, 2017). As a part of its commitment, Mexico has implemented climate policies such as the General Law on Climate Change (GLCC) launched in 2012. This law aims to promote the transition to a competitive and sustainable low-carbon economy through the elaboration and implementation of public policies and mechanisms that regulate and control GHG emissions. The GLCC sustains the creation of a National Emissions Registry, managed by the Ministry of Environmental and Natural Resources (SEMARNAT), to which individuals and legal entities who produce more than 25,000 tons of carbon dioxide per year must report their direct and indirect GHG emissions. It is important to highlight the mandatory character of reporting because entities that do not submit information face a monetary sanction. The law also promotes the design and development of economic instruments such as carbon taxes and emissions-trading systems to provide incentives to reduce the GHG emissions (Grantham Research Institute, 2018). All the climate policies and economic tools discussed above will increase the costs on companies in sectors that have relied on fossil fuels such as oil, mining, gas, and energy. Furthermore, if the producers transfer these costs to consumers then the prices for end-users will increase and, in the long-term, they will be obligated to use alternative products like renewable energy technologies, which will induce shifts in the demand curve, reducing revenues of firms. For companies that have started the transition to a low GHG emissions model, for example, power generation from clean energy technologies, there is an opportunity to benefit from increased access to new capital sources from investors concerned about climate change issues.

As international and national standards become more robust companies face greater exposure to the costs of climate risk, and international investors are taking into account climate change related issues in their decision-making processes. In taking decisions on the allocation of capital, investors are increasingly comparing the costs and benefits of investing in high carbon-intensive sectors and switching allocative decisions from high to low-carbon assets (Buchner et al. 2017).

1.2 Concept of climate risk

The unpredictable nature of the negative impacts of climate change on companies, firms, and economic sectors has led to increasing attention by investors on climate-related risk assessment and management. Investors are concerned about the grade of exposure of their investment portfolios due to the inherent and uncertain characteristics of this type of risk; such as, the long-term impacts, frequency and unknown severity, and not-diversifiable nature (TCFD, 2017).

Experts classify climate risks in three major categories: physical, transition and liability. Physical risk refers to the direct impacts on sectors and business-drivers because of changes in climate patterns and the occurrence of extreme climate events (TCFD, 2017). Such is the case of the agriculture sector in Mexico, which contributes 3.42% to national GDP (World Bank, 2017). Weather events, such as drought, frost, floods, and hail have significant impact on this sector because of its reliance on rain-fed systems that depend on specific rainfall patterns that may be disrupted with climate change. If the sector does not implement risk management strategies to adapt to short and/or long-term changes in the weather, then food production will be compromised. Consequently, a number of federal government agencies such as the Trust Funds for Rural Development (FIRA) have provided loans to farmers to foster the adoption of a climate-smart agriculture (CSA) framework (World Bank et al. 2014).

Transition risks are commonly related to the commercial resilience of companies' current business activities to regulatory changes — for example, the obligation imposed by the Mexican Ministry of Energy (SENER, *Secretaría de Energía*) to energy suppliers, qualified users and holders of interconnection agreements of complying with a minimum requirement to provide 5% of annual energy consumption from clean technologies. As a result, a market in clean energy certificates (CECs) has arisen in parallel with this regulation, allowing energy suppliers and users to obtain the required number of CECs to avoid penalties. In contrast, firms that do not fulfil the clean energy consumption criteria must bear the sanctions imposed, increasing their costs. In this Working Paper, I will focus on analysing transition risks because of their financial impacts on future cash flows of firms such as changes in costs, supply and demand curves, revenues and capital expenditure.

Litigation risk is related to the obligation to compensate for damages caused because of carrying out activities with potential negative impacts on the environment, climate, people's health, ecosystems, air and water quality, among others. From this perspective, fossil fuels companies' contribution to climate change represents a violation of the human right to a healthy environment. As a result, the number of plaintiffs against largest carbon producers has been increasing in courts in recent years. Some examples are the cases of the survivors of the Typhoon Haiyan in 2013 and the municipality-led suits in the US, claiming for climate damage compensation (Nachmany and Setzer, 2018).

All these risks have financial impacts on the business performance of firms. Institutional investors must evaluate these before making decisions to invest in a pool of assets. Usually, investors integrate financial assumptions into their pricing models to project future cash flows, revenues, and costs. Then, once an investment vehicle has been selected, the performance of the asset value is monitored over the investment period to detect and avoid losses. For this purpose, investors are encouraging companies to disclose details of the climate risks they face in their businesses in order to make more informed allocation decisions (TCFD, 2017).

1.3 Task Force on Climate-related Financial Disclosures

As a result of the request by financial sector representatives to the Financial Stability Board (FSB) to consider the implications of climate-related issues in their business activities, the FSB created the

Task Force on Climate-related Financial Disclosures (TCFD) in December 2015.⁴ The Task Force is constituted by 32 members, including banks, pension funds, insurance companies, asset managers and credit rating agencies. In June 2017, the TCFD launched its final report including a set of recommendations for firms to disclose information related to climate risk in their annual reports. The TCFD's final report resulted after 18 months of consultation with financial leaders. However, the expectation is that the dialogue and feedback processes will continue between the members, requiring the publication of subsequent reports. The TCFD recommendations aim to encourage companies to evaluate and disclose their climate-related risks and opportunities in their business activities. The target audience of the disclosures are investors, lenders and insurance underwriters, usually called primary users. These guidelines rest on four pillars: governance, strategy, risk management, and metrics and targets.

The first and the most critical pillar is *governance*, which relies on the Board's oversight of climate-related risks and opportunities, and its dissemination throughout the institution on the management's role in assessing and managing climate-related risks and opportunities. The second pillar is the *strategy*, related to the identification, evaluation, and analysis of a firm's resilience capacity for risks and opportunities faced over time and considering different climate scenarios. *Risk management* is the third pillar, and refers to the firm's processes for identifying, assessing, and managing climate-related risks. Finally, the *metrics* used to assess climate risk and opportunities, for example, GHG emissions accounting and shadow carbon price, and their performance against the internal company *targets* (TCFD, 2017). Companies must align these targets with the NDCs and to the goal of limiting global warming to well below 2°C and to pursue efforts to limit the increase to 1.5°C, according to the Paris Agreement. In Section 3 - "Suggestions of Governance mechanisms to adopt the TCFD disclosure framework" - I will examine how a Development Bank, like NAFIN, might incorporate these four pillars into its business activities.

It is important to mention that before the launch of the TCFD recommendations other disclosure initiatives have been developed.⁵ However, the existence of these frameworks led to a fragmentation of the market and made it difficult to compare between companies' disclosures. For this reason, the TCFD defined a standardised framework and promotes the alignment with its recommendations. The TCFD guidelines are voluntary, but they set out to challenge governments to complement them with mandatory disclosure policies to increase the information available to investors (TCFD, 2017).

Overall, these initiatives are encouraging companies to identify, assess and disclose how they mitigate climate risks. In mainstreaming this requirement, some companies are improving their climate risk management tools and are incorporating governance mechanisms in their business activities in order to attract international investors concerned about climate change issues.

⁴ The FSB was established in April 2009 with the aim of coordinating at the international level the work of national financial authorities to develop and promote the implementation of effective regulatory and supervisory policies in the interest of financial stability. Mark Carney, Governor of the Bank of England, is the Chairman of the FSB. In April 2015, the G20 asked the FSB about how the financial sector could take account of climate-related issues. In response, the FSB created the TCFD.

⁵ A tool that lets investors identify the management quality and carbon performance of companies according to the Paris Agreement targets is the Transition Pathway Initiative (TPI), launched in 2017. The TPI classifies companies at different levels based on their alignment to Paris targets. Moreover, this tool provides a comparison between companies by economic sector helping investors to make decisions (Sullivan et al. 2016).

2. NACIONAL FINANCIERA AND CLIMATE RISK

2.1 Assessment of climate risk on NAFIN's loan portfolio

NAFIN's overview

NAFIN is a Development Bank wholly-owned by the Mexican Government. Its principal goal is to provide access to affordable financing to micro-, small- and medium-sized enterprises (MSME's), as well as entrepreneurs and strategic investment projects in Mexico. NAFIN mainly operates three kinds of products: first-tier loans, second-tier loans, and loan guarantees. First-tier loans are made directly by NAFIN to borrowers, principally involved in developing specific projects in Mexico. Second-tier loans consist of credit lines that the bank makes available to financial intermediaries for funding specific loan programmes. Almost 70% of NAFIN's total loan portfolio consists of second-tier lending, i.e. through commercial banks and non-banking financial entities. These financial intermediaries are responsible for approving loan applications and placing the resources provided by NAFIN. Finally, NAFIN also provides guarantees for loans to MSMEs originated by third-party commercial lenders.

In the following section, I will breakdown NAFIN's loan portfolio by economic sector to analyse its exposure to climate risk. Also, I will compare it with the financial benchmark of Commercial and Development Banks in Mexico.

Assumptions for the assessment

The Mexican Banking and Securities Commission (CNBV) is the Regulatory Authority for all the financial entities in Mexico. All banks must report the classification of their loan portfolios on a monthly, quarterly and yearly basis to the CNBV according to the categories set under the Banking Circular. The CNBV publishes historical databases with the breakdown of the loan portfolio of each bank through its statistical information tool on its website.

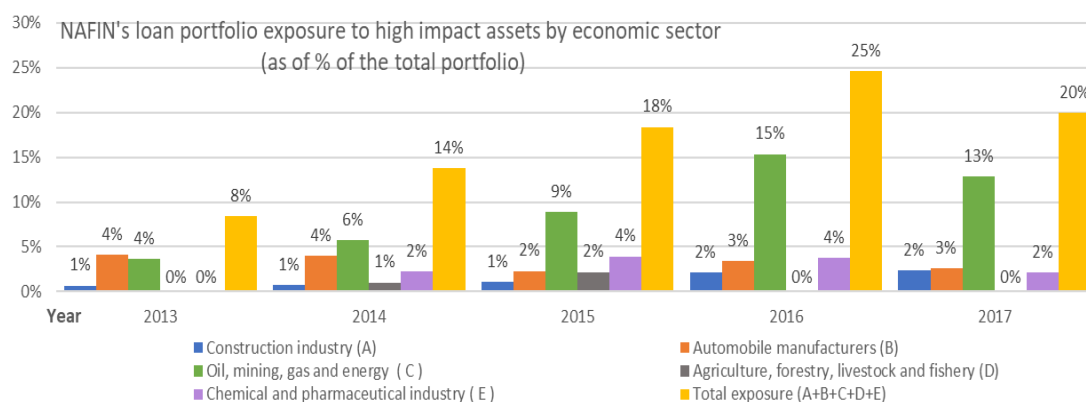
For this assessment I am considering the following assumptions:

- I will only use the information published on the website of the Commission.
- The loan classification set out under the Banking Circular provides a methodology to classify the loan portfolio in (i) consumer loans (ii) mortgage loans and (iii) commercial loans. In this analysis, I will only work with the commercial loans, because consumer and mortgage categories are not representative of Development Banks.
- In this analysis, I will not include the loan guarantees programme operated by NAFIN, because these amounts are "off balance sheet." So, when I mention loan portfolio through this Working Paper, I am only referring to first and second-tier loans in the case of NAFIN.
- Through this assessment, I will not classify the second-tier loans as high or low-risk assets, because the CNBV databases label second-tier as "financial services" which, in a preliminary approach, are not considered as a high climate change impact sector. However, I will discuss some ways in which NAFIN can control the exposure faced in relation to this kind of loan.
- I will calculate the exposure regarding the amounts financed.

Outputs of the assessment

As of December 2017, NAFIN's exposure to investments in sectors with high climate change impact represents 20% of its total loan portfolio, mainly distributed among the following economic sectors: construction, automobile manufacturers, the chemical and pharmaceutical industry, oil, mining, gas, and energy. Figure 1 shows the exposure of NAFIN by economic sector and its evolution since 2013. We can observe that total exposure in carbon-intensive sectors has increased since 2013, mainly in the oil, mining, gas and energy sector, which represented 4% of the total portfolio in 2013 in comparison with 13% in 2017. This growth relies on the implementation of the Financial Reform enacted in 2014, which encourages Development Banks, like NAFIN, to finance economic sectors underserved by Mexican commercial banks, such as energy, oil, gas and infrastructure.⁶

Figure 1: Performance of NAFIN's loan portfolio exposure⁷



Source: CNBV (2017)

An important question arises after the assessment—to what extent is NAFIN exposed to investments in high climate change impact assets. To solve this question, I made a comparison with the Mexican Banking System exposure.

As of December 2017, NAFIN's exposure to investments in sectors with high climate change impact is below that of the Banking System. It represents 20% of the total loan portfolio in comparison with 27% and 28% for Development and Commercial Banks, respectively. However, the data also show greater exposure levels in the oil, mining, gas, and energy sector in comparison with both Development and Commercial Banks in Mexico generally (Figure 2).⁸ It is important to highlight that each Mexican Development Bank focuses on the provision of finance to specific sectors. BANOBRAS, for example, finances infrastructure projects and public services,

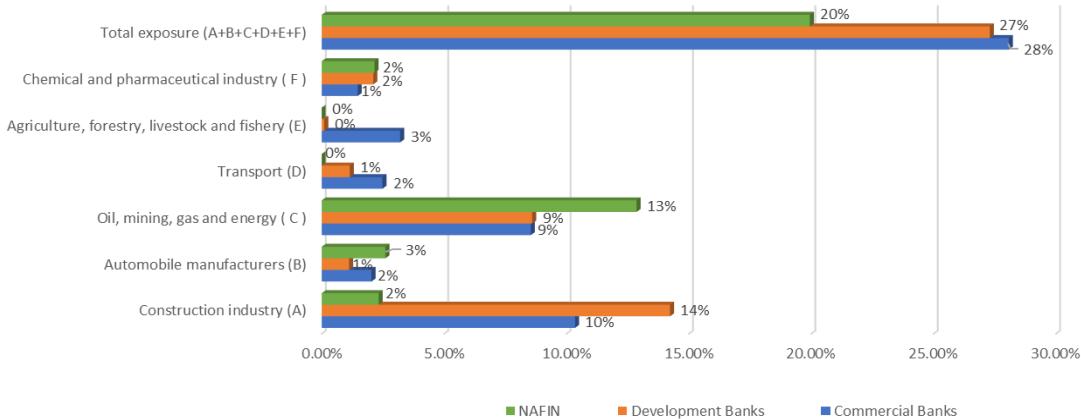
⁶ Executive Summary of the Financial Reform available at: https://www.gob.mx/cms/uploads/attachment/file/66457/6_Financiera.pdf

⁷ The percentages in the graph are calculated as the credit amounts granted to each industry divided by total loan portfolio amount.

⁸ The category Development Banks includes Banco Nacional de Obras y Servicios Públicos (BANOBRAS), Banco Nacional de Comercio Exterior (BANCOMEXT), Sociedad Hipotecaria Federal (SHF), Banco Nacional del Ahorro y Servicios Financieros (BANSEFI), Banco Nacional del Ejército, Fuerza Aérea y Armada (BANJERCITO) and NAFIN.

representing more than 80% of the total finance granted for the construction industry by Development Banks. While NAFIN promotes the development of the local MSMEs and others under-banked investment projects, therefore it is not a surprise the greater exposure of NAFIN to the oil, gas and energy sector. In this sense, the fact that NAFIN shows this exposure is not an indication of riskier loans per se because these investments are part of NAFIN’s role. NAFIN is also exposed to the automotive industry, to a lesser magnitude than the energy sector, some examples of projects financed are those focused on the renovation of cargo, passenger and tourism vehicle fleets.

Figure 2: NAFIN’s exposure by economic sector in comparison with the Banking System



Source: CNBV (2017)

As result of the key role of NAFIN for financing the oil, gas and energy sector since 2013, and its greater exposure showed in Figure 2, I will discuss in the following section about the GHG emissions generated by the energy industry in Mexico and the outlook for 2040, in order to identify how the new climate policies might affect borrowers relying on fossil fuels.

2.2 Carbon intensity of the Mexican energy industry

The carbon intensity is a measure of the carbon dioxide emissions associated with an economic activity. In the electricity sector, for example, it refers to the carbon emissions per unit of electricity generated. The International Energy Agency (IEA) estimated the carbon intensity of Mexico's electricity generation as 457 grams of CO2/kWh in 2014. Based on the Biennial Update Report to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, Mexico's GHG emissions were equivalent to 665 million tonnes of carbon dioxide (MtCO2-eq). Of this figure, the IEA estimated CO2 emissions at 431 million tonnes (Mt) in 2014. By economic sector, transport generates 35.1% of Mexico's CO2 emissions, followed by the power generation sector with 32.0%, then the manufacturing and construction industries with 13.4% and other energy industries with 12.1% (including refining). Households, public services, agriculture, and forestry represent the remaining 7.4% (International Energy Agency, 2017).

The Mexican electricity sector has been facing many changes since the launch of the Energy Reform in 2013. The most significant is the alignment to comply with Mexico’s NDCs in the transition to a low-carbon economy. For example, the Electricity Industry Law (LIE) came into

force in August 2014 with the aim of fostering the sustainable development of the electricity industry through the imposition of a minimum percentage requirement of annual energy consumption from clean technologies on a yearly basis. As a consequence, firms that do not meet the required consumption targets must bear sanctions, increasing their costs. Another important regulation is the Energy Transition Law (LTE), published in December 2015 with the goals of promoting the sustainable use of energy, define obligations in the use of clean energies, and reduce GHG emissions produced by the energy industry in Mexico. Under this law, power generators that use fossil fuels are obligated to substitute their carbon-intensive technologies gradually. The LTE defines Mexico's clean energy goals of 25% by 2018, 30% by 2021 and 35% by 2024 as a percentage of the country's total power generation (Grantham Research Institute, 2017).

The growth in co-operation between IEA and Mexico in recent years culminated with the incorporation of Mexico to the Agency in February 2018, becoming the first member in Latin America (International Energy Agency, 2018). The IEA has developed a Mexican Energy Outlook for 2040. They are comparing a baseline scenario (No Reform Case), a New Policies Scenario regarding the Energy Reform and considering an annual average economic growth of 3.1% between 2014 and 2040, and an Enhanced GDP Case assuming an annual average economic growth of 4.0% to 2029. In Figure 3, we can observe some key energy indicators resulting from the IEA scenario analysis. Under the New Policies Scenario, the primary energy demand increases by 20% between 2014 and 2040. The economic growth will remain the main contributor to energy demand, as it has been historically. The share of fossil fuels will decrease to 86% in 2040 from 92% in 2014. Besides, it is expected that CO₂ emissions related to power generation fall by almost 20% by 2040, implying a 52% drop in carbon intensity, although the electricity generation will increase by 70%.

Figure 3: Mexico key indicators from IEA scenario analysis

	2014	New Policies Scenario		Enhanced GDP Case		No Reform Case	
		2025	2040	2025	2040	2025	2040
Primary energy demand (Mtoe)	188	196	225	207	245	200	226
Share of fossil fuels (%)	92	89	86	89	86	91	87
Final consumption (Mtoe)	118	134	156	144	174	134	155
Electricity demand (TWh)	248	326	459	344	505	327	450
Energy intensity of GDP (2014=100)	100	75	54	72	52	77	57
Carbon intensity of power (2014=100)	100	64	48	63	48	77	57

Source: International Energy Agency (2016)

Another important feature of the Energy Reform was opening the market to competition after removing the monopoly to the Federal Electricity Commission (CFE). This measure allows the

reduction of electricity generation costs and will enable the elimination of subsidies on electric use which represent between 60% and 70% of the price for end-users. Without subsidies the price of electricity will increase, encouraging consumers to look for alternative electricity sources from renewables, which will become attractive as their production costs are decreasing over the years.

Considering the Energy Reform and the climate pledge made at COP21, Mexico will diversify its energy mix by increasing the use of renewables, which will account for 37% of the electricity generated by 2040. This will be in the context of rising incomes and population that are expected to increase energy demand by about one-fifth above current levels by 2040. Therefore, the challenge is to cover the growing demand for energy without increasing CO₂ emissions, and the use of clean energy technologies emerges as the only way to achieve this important task. Although Mexico will underpin the country's targets to decarbonise its energy system under the Energy Transition Law (LTE), Mexico will not achieve the pledge without additional measures, which would require GHG emissions to drop to around 620 Mt in 2030 (International Energy Agency, 2016).

2.3 Carbon intensity of Mexican exports and imports

Although the United States represents more than 50% of Mexico's crude oil exports, they have been decreasing since September 2015 in absolute terms, when monthly US crude oil imports from Mexico fell to the lowest level since 1990 (Energy Information Administration, 2015), falling 17% between 2011 and 2016 (Chatham House, n.d.). Meanwhile, Mexican crude oil exports to Europe and Asia have risen, especially to Spain and India (Energy Information Administration, 2015). In 2015, Mexico exported 61.2 Mt (million tonnes), mainly to the United States (60%), Spain (14.1%) and India (9.4%). Mexico's reliance on crude export revenues makes the country sensitive to changes in oil production and prices (International Energy Agency, 2017). As a result of the implementation of climate change policies in importer countries, there is a significant risk for the Mexican oil sector to bear weaker oil demand and lower prices in future, affecting income flows for companies that rely on export activities.

Because the US has pulled back from its international climate commitments, the Climate Action Tracker (CAT) classifies the current climate policies as critically insufficient to reach the Paris Agreement targets; the projection is for a reduction of only 11-13% below 2005 levels by 2025 (against its NDC target to reduce net GHG emissions by 26-28%). As a result of the delay to the implementation of climate policies, reaching the NDC target will require additional and stringent policies in the use of fossil fuels in future years, which could decrease the US imports of crude oil, affecting Mexico because of the importance of US in the country's energy trade balance. Moreover, some major US states are putting in place ambitious climate policies: for example, California has an executive order to be carbon neutral (Competitive Enterprise Institute, 2018). These measures will affect Mexican companies as the country's exported 12,957 thousand barrels of crude oil to California in 2017, representing more than 5% of the US total crude oil imports from Mexico (Energy Information Administration, 2017).

Spain must align to the policies implemented in the EU, which are insufficient with holding global warming below 2°C according with the Paris Agreement. However, the CAT estimates that the more ambitious renewable energy and energy efficiency targets adopted in 2018 will meet the current NDCs. In addition, the European Parliament has called for raising the aspiration of the EU's NDC, which will require increases in the use of renewable energy and define new energy efficiency targets for 2030. The adoption of these new targets must be followed by measures and policies that will accelerate emissions reductions, requiring much faster actions (Climate Action Tracker). These new policies could reduce the demand for fossil fuels in Spain which might potentially affect the imports of crude oil from countries like Mexico.

India's commitments are consistent with the 2009 Copenhagen 2°C goal and fall within the country's fair share range. However, they are not entirely consistent with the Paris Agreement. As a result, India is increasing its investments in renewable energy, mainly solar power, and the government recently increased its capacity target for renewables from 175GW to 227.6 GW (Climate Action Tracker). In consequence, the cost of solar power has decreased in the last two years and if this trend continues, it will become the preferred choice for distribution companies. Although CAT expects that India could achieve its NDC target with the currently implemented policies, the country has also committed to increasing the use of electric vehicles on its roads to 30% by 2030, reducing dependence on oil imports (Bloomberg, 2018). As a result, these climate policies will imply additional climate transition risk to oil exporters in Mexico in future years. Moreover, India has implemented measures to reduce the use of other fossil fuels, for example, it is expected that no additional gas-fired plants will be deployed after 2022 in this country, showing its alignment with the phase-out of gas power.

By contrast with India, in countries like Mexico, the transition to a low-carbon economy will not be achieved without shifting from oil to natural gas. Therefore, natural gas will account for almost 70% of the growth in primary energy demand in Mexico by 2040, increasing the share of gas in total primary energy demand to 38%, while reducing the percentage of oil from 51% to 42%. However, the domestic natural gas production will not be enough to cover the rapidly increasing demand, therefore Mexican companies will continue to rely on the imports of gas from the United States. Likewise, natural gas prices in the United States will have a significant influence on the relative attractiveness of developments in Mexico (International Energy Agency, 2017).

2.4 Impacts of climate transition risks on NAFIN's portfolio

The implementation of climate policies that aim to encourage companies to reduce their emissions and promote the sustainable use of energy will increase the direct and indirect costs of firms in high carbon-intensive sectors, such as oil, gas and electricity. An example of a current policy that can increase the direct emissions costs of Mexican firms is the imposition of a carbon tax to producers and importers of fossil fuels. Other companies will be indirectly affected, for example, those that use fossil fuels as a raw material must face an increase in prices of production inputs. Also, companies that depend on crude oil exports will reduce their revenues as a result of the climate policies implemented in importers countries such as the United States, India, and Spain. Moreover, the expectation is that Mexico will not achieve the pledge in GHG emissions reductions by 2030 under the current policies, meaning that the government must implement more aggressive and disruptive climate policies in the use of fossil fuels in future years to meet the Paris Agreement goals (International Energy Agency, 2016). In consequence, the exposure to climate transition risks of investments in high carbon-intensive sectors will increase significantly.

Even before these changes, the use of clean energy technologies has been increasing as a result of the transition to a low-carbon economy, which contributes to a decline in generation costs over time. Under the current climate policies, for example, the use of renewables is set to grow by 2040, becoming the principal vehicle to achieve the clean energy goals defined in the Energy Transition Law (LTE). In this sense, investments in low-carbon sectors are becoming attractive as they will minimise the risk of 'stranded assets' and will provide diversification opportunities and long-term risk-adjusted returns in loan portfolios. Besides, there is a need to mobilise climate finance flows in developing countries like Mexico, and Development Banks like NAFIN could play an important role by reducing risks and leveraging finance (Garmendia, 2017). Moreover, increasing the investments in low-carbon projects will improve NAFIN's credibility and reputation.

An exposure to climate transition risk was detected through the assessment of NAFIN's loan portfolio because of its investments in high carbon-intensive sectors. The increase of carbon costs and shifts in the demand curves of Mexican firms induced from the implementation of climate policies, will impact the creditworthiness of NAFIN's borrowers as result of a lower capacity to pay their liabilities, increasing their probability of default. In consequence, the non-performing loans on NAFIN's portfolio will grow (Colas et al. 2018). The proposition is that NAFIN should be able to mitigate this risk both in terms of implementing governance mechanisms to assess and manage these increasing risks in a robust and integral way, and transparently disclose the risk faced on its loan portfolio to international investors according to the TCFD framework. It is important to highlight that NAFIN must act as soon as possible because delaying the implementation of a climate risk management strategy will damage the bank's reputation for lending to high carbon-intensive sectors and will create overexposure to carbon industries sensitive to climate risks (UNEP FI, 2017).

3. SUGGESTIONS OF GOVERNANCE MECHANISMS TO ADOPT THE TCFD DISCLOSURE FRAMEWORK.

The Transition Pathway Initiative (TPI) designed a set of questions to assess and categorise companies' management of climate risk (see footnote 5). The Initiative defines five levels based on the quality of companies' management of climate risks and future carbon performance in comparison with international targets and national pledges (Sullivan 2016). Companies classified at level 0, the worst, are unaware of the potential impact of climate change for their business. While, firms categorised at level 4, the best, have recognised climate change as a significant issue for their business, they have reduced their GHG emissions over the past three years supporting domestic and international efforts to mitigate climate change, and they have published information on the business costs associated with climate change.

Using the methodology proposed by TPI and considering the key role of NAFIN in supporting Mexico's transition to a low-carbon economy through the finance of sustainable projects and its knowledge about the Green Bond Market, I suggest that NAFIN is on level 1. This means that NAFIN recognises climate change as an issue for its business and should have a commitment to take actions to assess and manage the risks faced. For this reason, in the following section, I will suggest some principles, policies and people that NAFIN should consider incorporating on its decision-making processes, in case that it is interested in attracting new investors, to assess the climate risk and prepare the disclosure for investors based on the recommendations made by the TCFD.

3.1 Principles and policies

To develop a successful integrated strategy on climate action, NAFIN should consider the implementation of the Voluntary Principles for Mainstreaming Climate Action developed by members of the Climate Action in Financial Institutions Initiative.⁹ It is important to highlight that the Latin American Association of Development Financing Institutions (ALIDE) and the International Development Finance Club (IDFC), to which NAFIN belongs, have underwritten the

⁹ In December 2015, 20 institutions launched the Climate Action in Financial Institutions Initiative with the objective of supporting financial institutions face the concrete challenges of the integration of climate considerations into their different activities and operations. Some of these institutions include Multilateral Development Banks, Commercial Banks, Finance Corporations, International Agencies among others.

Climate Action Initiative, representing an additional incentive for NAFIN to adopt these Voluntary Principles. These principles are focused on supporting and guiding financial institutions, like NAFIN, to move forward with the process of adapting and promoting low-carbon climate resilient development (Cochran et al. 2017):

1. Commit to climate strategies.
2. Manage climate-related risk.
3. Promote climate-smart objectives.
4. Improve climate performance.
5. Account of climate action.

The first step for NAFIN is to include the ***commitment to national and international climate strategies*** as part of its key objectives. This means that NAFIN business activities must be consistent with the national target to reduce GHG emissions of 30% by 2020 and 50% by 2050 compared to 2000 base year levels (GLCC). Furthermore, its activities must be aligned to the goal of limiting global warming to well below 2°C and to pursue efforts to limit the increase to 1.5°C, according to the Paris Agreement. Although NAFIN has been gaining knowledge about the local market, technology, policy and political conditions involved with low-carbon projects (Garmendia, 2017), the bank needs to be able to extrapolate the guidelines, procedures, and expertise used to evaluate climate risks on low-carbon projects into the entire loan portfolio.

NAFIN will be responsible for developing the policies to materialise this commitment in different time horizons and climate change scenarios. The ***definition of overarching objectives and targets in decarbonisation of loan portfolio*** will let the bank translate the commitments into more rigorous lending criteria (Cochran et al. 2017). Some suggested metrics to define these targets are a minimum percentage of loans on clean energy projects or a minimum level green/brown energy finance ratio (Hawkins et al., 2018). In addition, NAFIN can establish targets in terms of GHG emissions, for example, portfolio-wide gross GHG emissions and portfolio-wide avoided (net) emissions (Germanwatch & NewClimate Institute, 2018).

The second step that NAFIN should take is integrate climate change policies through all its financial strategies, ensuring that loans are allocated within a low-carbon and resilience context, taking climate risk into account (Hawkins et al., 2018). This will involve the acquisition of commitments to allocate resources toward low-carbon instead of high-carbon projects. In this sense, ***the introduction of an internal shadow carbon price (SCP)*** represents a helpful tool since it allows a de-prioritisation of high emissions projects (Espinosa, 2018). SCP allows an evaluation of the financial viability of a project through a cost-benefit analysis. Moreover, it serves as a comparison tool to appraise the cost of a project against alternative projects that generate the same benefit (Germanwatch & NewClimate Institute, 2018).

As part of the Fiscal Reform, the Mexican Congress approved the imposition of a carbon tax to producers and importers of fossil fuels in November 2013 (Grantham Research Institute, 2016). Based on the last update of the Special Tax Law on Production and Services (LIEPS), the current carbon tax in Mexico is MXP\$48.87 (USD\$2.5) per ton of carbon contained on the fuel (Diario Oficial de la Federación, 2018).¹⁰ However, given its low rate, its impact on GHG emission reduction has not been substantial enough to reduce emissions significantly. Because of the low rate of the carbon tax and the absence of a cap-and-trade system in Mexico, the introduction of a global

¹⁰ FX rate of MXN19.6566 per US\$1 published by Banco de Mexico on December 28, 2018.

shadow carbon price would be the first step for a more ambitious carbon price in the future (Germanwatch & NewClimate Institute, 2018).¹¹ Then, NAFIN should consider introducing the carbon price level suggested by the High-Level Commission on Carbon Prices (HLCCP) in order to align its financial flows with the Paris Agreement. The HLCCP sets the carbon price range between USD\$40 to USD\$80 per ton of CO₂ equivalent in 2020, and between USD\$50 and USD\$100 in 2030 (Espinosa, 2018). The adoption of a shadow carbon price on NAFIN's credit processes will allow the bank to apply it as a risk assessment tool for testing the sensitivity of a project's profitability under different climate policy scenarios, considering possible increases in the SCP under more stringent policies. Besides, the use of SCP will let the banks to forecast the performance of future emissions costs using forward-looking analysis. Regardless of the methodology that NAFIN might use to incorporate a shadow carbon price, it is important to highlight that the bank must disclose to investors this methodology as suggested by the TCFD framework.

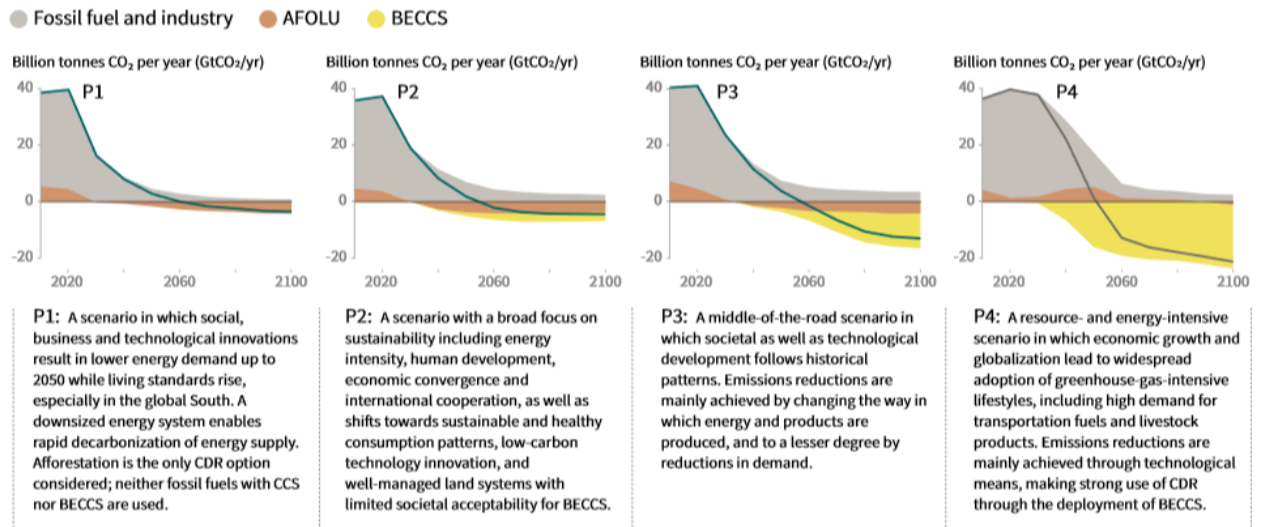
Academic institutions and non-governmental organisations such as the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) have developed transition scenarios regarding global average temperature increases for specific time horizons (for example 1.5°C, 2°C, and 4°C). There are multiple paths to achieve each temperature scenario depending on assumptions related to interactions between policy and technology to mitigate climate change. In Figure 4 we can observe an example of a 1.5°C transition scenario by 2100 analysed from four different pathways considering different assumptions about climate policies, use of technologies and peoples' behaviour. The importance of transition scenarios relies on the outputs of the analysis to assess the financial impacts on borrowers. For this purpose, scenario sources need to evaluate the most critical variables such as GHG emissions, and energy supply and demand by type of fuel, which credit experts must translate into financial terms (i.e. changes in costs, revenues, capital expenditure) to analyse how these new climate policies will affect borrowers.

The third step for NAFIN is to develop processes that focus on identifying risk factors on transition scenarios and assess their financial impacts over time, using the climate scenario analysis as the primary tool. This assessment shall be performed by borrower and portfolio levels (Colas et al. 2018). *Climate scenario analysis* will provide the evolution of climate change over decades (long-term) and is intended to assess the sensitivity of a loan portfolio under a range of possible outcomes of future climate-related events under conditions of uncertainty. This new climate stress testing methodology would look to improve previous carbon disclosures by considering *forward-looking analysis*. An advantage of using this analysis is to help banks to identify their vulnerabilities in the transition to a low-carbon economy, bringing them more time to adapt to the new policies and adequate its structure to mainstream climate action (Colas et al. 2018).

¹¹ A voluntary Emissions-Trading Scheme (ETS) will begin operation until 2022 (Climate Action Tracker).

Figure 4: Example of four illustrative model pathways by IPCC (temperature scenario: limit global warming to 1.5°C)

Breakdown of contributions to global net CO₂ emissions in four illustrative model pathways



Global indicators	P1	P2	P3	P4	Interquartile range
Pathway classification	No or limited overshoot	No or limited overshoot	No or limited overshoot	Higher overshoot	No or limited overshoot
CO₂ emission change in 2030 (% rel to 2010)	-58	-47	-41	4	(-58, 40)
↳ in 2050 (% rel to 2010)	-93	-95	-91	-97	(-107, -94)
Kyoto-GHG emissions* in 2030 (% rel to 2010)	-50	-49	-35	-2	(-51, -39)
↳ in 2050 (% rel to 2010)	-82	-89	-78	-80	(-93, -81)
Final energy demand** in 2030 (% rel to 2010)	-15	-5	17	39	(-12, 7)
↳ in 2050 (% rel to 2010)	-32	2	21	44	(-11, 22)
Renewable share in electricity in 2030 (%)	60	58	48	25	(47, 65)
↳ in 2050 (%)	77	81	63	70	(69, 86)
Primary energy from coal in 2030 (% rel to 2010)	-78	-61	-75	-59	(-78, -59)
↳ in 2050 (% rel to 2010)	-97	-77	-73	-97	(-95, -74)
from oil in 2030 (% rel to 2010)	-37	-13	-3	86	(-34, 3)
↳ in 2050 (% rel to 2010)	-87	-50	-81	-32	(-78, -31)
from gas in 2030 (% rel to 2010)	-25	-20	33	37	(-26, 21)
↳ in 2050 (% rel to 2010)	-74	-53	21	-48	(-56, 6)
from nuclear in 2030 (% rel to 2010)	59	83	98	106	(44, 102)
↳ in 2050 (% rel to 2010)	150	98	501	468	(91, 190)
from biomass in 2030 (% rel to 2010)	-11	0	36	-1	(29, 80)
↳ in 2050 (% rel to 2010)	-16	49	121	418	(123, 261)
from non-biomass renewables in 2030 (% rel to 2010)	430	470	315	110	(245, 436)
↳ in 2050 (% rel to 2010)	833	1327	878	1137	(576, 1299)
Cumulative CCS until 2100 (GtCO₂)	0	348	687	1218	(550, 1017)
↳ of which BECCS (GtCO ₂)	0	151	414	1191	(364, 662)
Land area of bioenergy crops in 2050 (million km²)	0.2	0.9	2.8	7.2	(1.5, 3.2)
Agricultural CH₄ emissions in 2030 (% rel to 2010)	-24	-48	1	14	(-30, -11)
in 2050 (% rel to 2010)	-33	-69	-23	2	(-47, -24)
Agricultural N₂O emissions in 2030 (% rel to 2010)	5	-26	15	3	(-21, 3)
in 2050 (% rel to 2010)	6	-26	0	39	(-26, 1)

NOTE: Indicators have been selected to show global trends identified by the Chapter 2 assessment. National and sectoral characteristics can differ substantially from the global trends shown above.

* Kyoto-gas emissions are based on IPCC Second Assessment Report GWP-100
 ** Changes in energy demand are associated with improvements in energy efficiency and behaviour change

Source: Intergovernmental Panel on Climate Change (IPCC, 2018)

3.2 People and institutional capacity

NAFIN should ensure to integrate climate action into its strategy and structure, but also be ready to collaborate with external entities. At internal level the Board of Directors, Committees, Climate Change and Risk Management Units, credit experts and Human Resources will play a key role in implementing and monitoring the climate action into NAFIN, improving the institutional capacity of the bank. While, external stakeholders, such as Banking associations, regulators and supervisors are responsible for preserving the Banking System's safety against climate change issues.

Internal level

The implementation of a climate change strategy requires inserting climate action directly into all existing governance structures. These actions include the assignment of specific roles and responsibilities across all bank departments to ensure success. For this purpose, banks need to develop their own structure that should be easy to understand to ensure maximum take-up across the institutions (UNEP FI, 2017). With the objective of creating its own structure, NAFIN might consider the following key initiatives:

- ***Senior level commitments are required to address climate change on an institution.*** NAFIN's Board of Directors must have a positive influence on building a climate change framework throughout all levels of management and operations, based on its strategic vision and leadership (UNEP FI, 2017). For this purpose, the Board of Directors needs to approve targets and design ***reporting mechanisms*** to monitor their performance, allowing the Board to implement mechanisms of correction when the bank does not achieve the goals and exceeds the climate risks tolerance levels.
- An ***action plan*** must complement the definition of targets, providing concrete measures to meet these objectives. Before launching this plan, NAFIN will need to evaluate the existing resources that it can realistically use. A well-designed plan will allow the bank to accelerate the implementation of strategies on climate action if it develops them under a strategic priority policy (Cochran et al. 2017). NAFIN could disseminate the commitment to climate strategies inside the bank structure and business areas with the support of senior management. For this purpose, NAFIN should evaluate ***the creation of a Climate Change Committee to observe the implementation of climate strategies and the action plan***, which should be integrated by Directors of key business areas, serving as a top-down instrument. Likewise, this Committee will be responsible to inform to the Board of Directors the advances in the implementation on a periodic basis (Cochran et al. 2017).
- A ***Climate Change Specialised Unit*** could be created to influence, formulate, drive, execute, report, monitor and improve the implementation of the climate strategy. This Unit will act as a bridge between the different business areas to foster consistency, collaboration, and innovation. It shall be able to shift the bank's way of thinking from a short-term to a long-term perspective and provide advice on climate matters to the senior management (UNEP FI, 2017). The Unit should identify the barriers and challenges that may affect the performance of climate metrics and the delivery of results (UNEP FI, 2017).
- For climate risk assessment, ***NAFIN should ensure that climate risk is considered part of the risk management strategy of the bank.*** The risk analysis is institution-specific, and NAFIN needs to exploit the resources at its disposal and the expertise of credit experts into the bank to identify the financial impacts of climate change on the creditworthiness of borrowers (Colas et al. 2018). The internal credit risk experts should be able to assess the

impact of risk factors on key financial metrics for credit rating models, such as cash flow/debt or debt/EBITDA to forecast the evolution of the probabilities of default and credit ratings of borrowers over time.

- The Risk Management Department should be the specialised unit responsible for identifying, measuring, supervising and internally disclosing the climate-related risks faced by the institution. Moreover, the ***Integral Risk Management Committee must oversee the alignment of the operative processes*** of NAFIN to the framework and climate exposure levels authorised by the Board of Directors. The Risk Department needs to be in constant dialogue with the Climate Change Specialised Unit to ensure that climate risk is adequately measuring into their assessments (UNEP FI, 2017).
- Human Resources (HR) will play a key role in mainstreaming climate action as new institutionalised roles should be created to achieve climate change commitments. HR must clearly delineate the new roles and responsibilities on the staff job description (Poulter, 2018). Also, ***an incentive structure considering contests, recognition, and compensation can be created to encourage the inclusion of climate actions*** and discourage change resistance for effective delivery of results (UNEP FI, 2017). HR will be responsible for encouraging employees to develop new products for climate-smart investments and evaluate the need for additional resources, specialised employees and targeted training (Cochran et al. 2017). The provision of technical assistance and training to business areas about climate change, will allow NAFIN to build internal capacity to identify climate risk factors and implement the institutional targets on the daily business activities (Cochran et al. 2017).

External level

In order to accelerate the successful implementation of climate strategies, NAFIN needs ***the support of external authorities*** such as the Central Bank, Banking Regulatory Authority and the Ministry of Finance. Banks should be ready to participate in working groups coordinated by the Banking authorities and associations to draft proposals for the sector related to climate change (Cochran et al. 2017). I will discuss an example of a regulation that could help to consider climate risk as part of bank's disclosure. Based on the principles and standards issued by the CNBV (Mexican Banking Regulatory Authority), banks disclose information related to their internal policies defined for managing risks on their websites.¹² However, as the time of writing this report, the principles and standards issued by the CNBV do not mention climate risk as a disclosure requirement, because the focus is on credit, liquidity, market, and operational risks. Although disclosing climate risks is not mandatory under this regulation, NAFIN should consider disclosing climate risk as part of its risk management strategy and transparency processes.

3.3 Processes

Accountability of climate action

The commitments and institutional targets defined by the bank have the primary purpose of improving the climate performance of NAFIN. However, rigorous policies for monitoring and

¹² Comisión Nacional Bancaria y de Valores, Article 88 of the General Rules applicable to credit institutions (Comisión, 2015)

reporting should complement these measures to be effective. NAFIN could monitor these targets through the definition of metrics in order to verify whether the bank is reaching the defined goals (Germanwatch & NewClimate Institute, 2018). An example of these metrics is the **GHG accounting** that measures the carbon footprint of an investment project. Although it does not lead to emission reductions, an effective GHG accounting system is a prerequisite for using other tools at the project level analysis, like shadow carbon pricing. It is also important for the definition of targets as part of the bank's strategy, for example, the GHG reductions in CO2 tons/year used in climate finance. I suggest NAFIN adopt the best practice of **account the Scope 1, 2 and 3 emissions** as outlined below. For this purpose, NAFIN should define the GHG accounting methodology for all project types, also including second-tier loans (Germanwatch & NewClimate Institute, 2018):

- Scope 1 refers to direct emissions from the financed project,
- Scope 2 is the GHG emitted during generation of electricity or heat used by the financed project; and
- Scope 3 describes other upstream and downstream emissions that are a consequence of activities by the company but are not under its control. Scope 3 emissions should include the induced emissions as a result of the economic activity.

NAFIN should assess the GHG emissions at the project appraisal stage into all its products. For **second-tier loans**, NAFIN might take a representative sample of the loan portfolio of final borrowers of each intermediary on a yearly basis to evaluate the correct allocation of resources. However, I suggest that in the case of climate change risk assessment other analysis and processes must be applied to observe the best implementation of climate change policies by financial intermediaries. Some policies that can be implemented to control this uncertainty, in conjunction with the financial intermediaries, are the introduction of a **minimum lending criteria** and **GHG emission thresholds for project screening**. The definition of these criteria and thresholds will help the financial intermediaries to identify loans for which a specific GHG emissions analysis must be applied. Also, they can develop **exclusion lists for certain high carbon-intensive sectors** for projects which banks choose not to finance (Germanwatch & NewClimate Institute, 2018). In addition, NAFIN should design a product development policy to assess the climate risk exposure for new lending products and services, before launching them to the market, as part of a complete feasibility and profitability analysis (UNEP FI, 2017).

Transparency to international investors

Once NAFIN has incorporated the commitment to climate strategies and the management of climate-related risk into its business activities, the next step is to implement a transparency policy to disclose in its annual report the organisation oversight about climate change, its strategy to identify climate risks and opportunities, the processes for assessing climate risk, and the metrics and targets used. NAFIN might publish this information within the recommendations proposed by TCFD for a decision-useful disclosure to investors, considering the following key points:

- NAFIN should describe the organisational structure, the frequency by which the management reports to the Board of Directors and Committees about climate-related issues, and the monitoring processes used to evaluate the progress against goals and targets for addressing climate-related issues.
- NAFIN should expose the climate-related issues that could have a financial impact on the bank across different time horizons (short, medium and long), explaining how the bank

prioritise and consider these issues into the financial planning process. Additionally, the resilience of the strategies to different climate scenarios might be indicated.

- NAFIN should explain the bank's processes for identifying, assessing and managing climate-related risks, describing how they make decisions to mitigate, transfer, accept, or control those risks. In addition, they should disclose the mechanisms for prioritising climate-related risks.
- NAFIN should undertake both historical and forward-looking analysis when considering the potential financial impacts of climate change. For this reason, the Task Force would encourage the use of scenario analysis into the bank's risk management practices.
- NAFIN should list the metrics and targets used to assess climate-related risks and opportunities, and their performance over time to allow for trend analysis. Also, they should reveal the methodologies defined to assess some metrics such as GHG emissions (Scope 1, Scope 2 and Scope 3) and shadow carbon prices. In all cases, NAFIN should compare the progress of these metrics against targets.

4. CONCLUSIONS

NAFIN invests almost 20% of its loan portfolio in high carbon-intensive sectors exposed to climate risks. Given the long-term impacts and the growth in frequency and severity of this risk, and as more stringent targets on global temperature are implemented over time, it is critical for the bank to start acting now. Moreover, the expectancy is that the Mexican Government will design more aggressive and disruptive climate policies in the use of fossil fuels to meet the Paris Agreement goals, which will increase the climate transition risk on NAFIN's loan portfolio in future years.

The implementation of a climate change strategy takes time because it implies inserting climate action directly into all the bank's structure and marks a radical shift in the way of thinking from a short-term to a long-term perspective. However, adopting the TCFD voluntary guidelines will allow the bank to disclose its climate-related risks to investors on its annual report as a first step. Meanwhile, the Board of Directors can start building a climate change framework throughout all levels of management and operations to address climate change into the institution, making use of their experience and leadership.

NAFIN needs to acquire commitments to allocate resources toward low-carbon instead of high-carbon projects, besides implementing principles, policies and processes to assess and manage climate risks in a robust way. The use of forward-looking analysis and climate scenarios will help to identify vulnerabilities on NAFIN's loan portfolio in the transition to a low-carbon economy, bringing NAFIN more time to adapt to the implementation of new climate policies. Furthermore, NAFIN will be able to anticipate future credit rating downgrades of borrowers and the increase of non-performing loans on its loan portfolio.

The fact that a Development Bank like NAFIN adopts the TCFD voluntary guidelines would represent a number of advantages for companies and authorities in Mexico. The bank will influence the firms in which it invests to provide better climate-related financial disclosures. Moreover, NAFIN could play a key role to facilitate the analysis of the materiality of climate risks, pushing Mexican authorities, such as the Central Bank, Banking Regulatory Authority and the Ministry of Finance, to develop mandatory disclosure policies aimed to increase the information available to

investors. Likewise, the involvement of Mexican authorities will encourage companies and financial entities to commit to the national and international climate goals, for example, the target of Mexico to reduce GHG emissions of 30% by 2020 and 50% by 2050 compared to 2000 base year levels (GLCC), and the goal of limiting global warming to well below 2°C and to pursue efforts to limit the increase to 1.5°C, according to the Paris Agreement.

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